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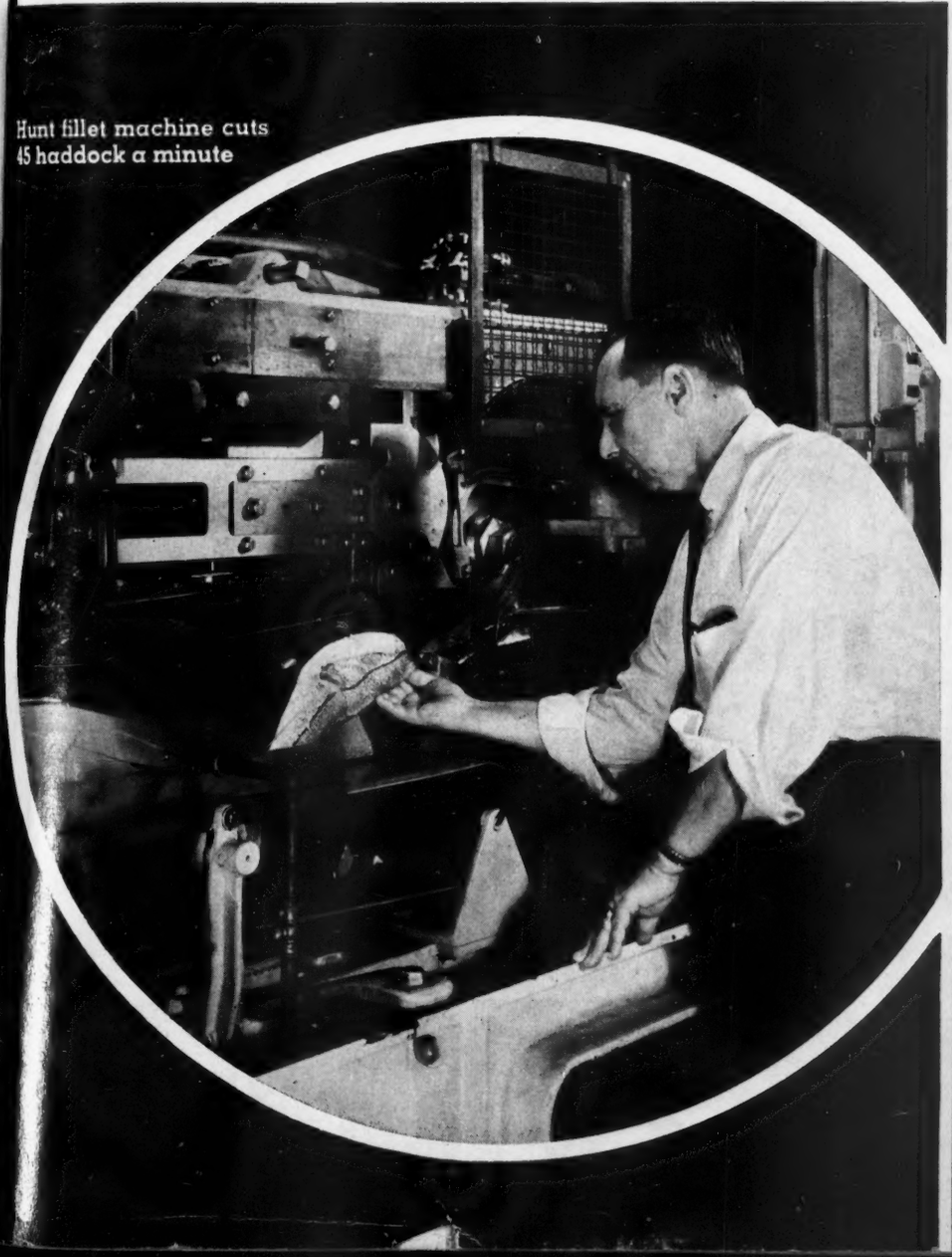
FOOD INDUSTRIES

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION



Hunt fillet machine cuts 45 haddock a minute

OCTOBER 1946

How to Get A Job In the Food Field

New Cleaning Aids Improve Sanitation

Defrosting of Foods By Electronic Heat

Fillet Machine Cuts All Sizes of Fish

Foil Pack Lengthens Shelf Life of Peas

Freezer Lockers Go Commercial

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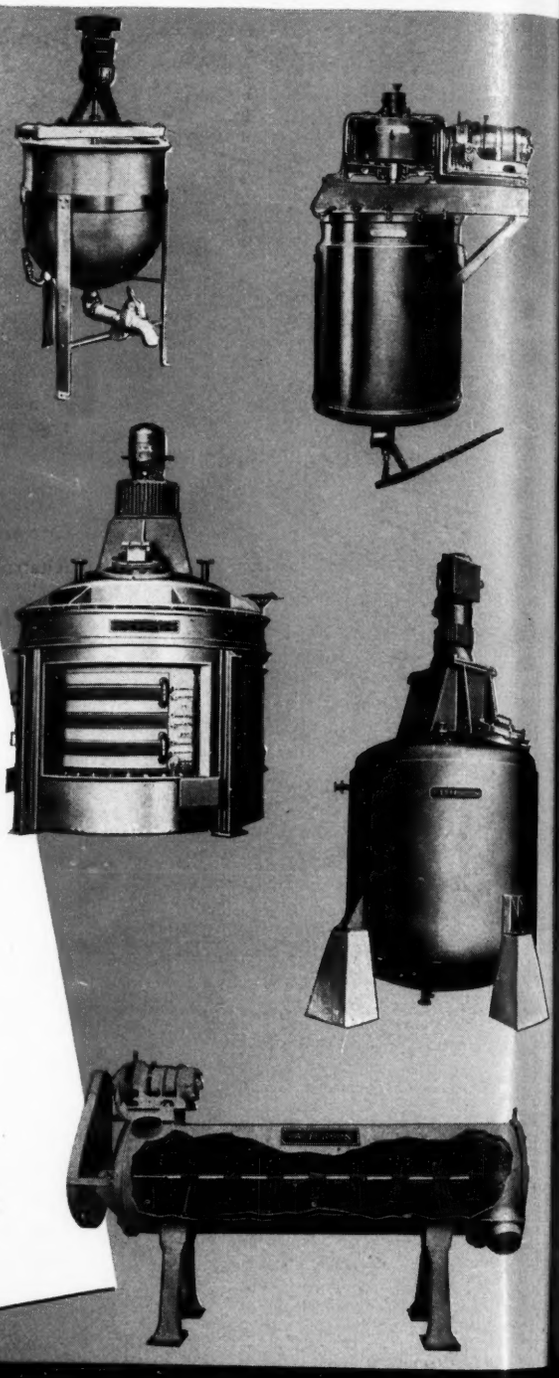

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FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

OCTOBER, 1946 Volume 18, Number 10

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THE COVER

A high-speed automatic cod and haddock machine fillets fish in all commercial sizes. The machine was developed by The Atlantic Coast Fisheries Co. Photo shows first phase of ribbing knife operation. See article on page 86.

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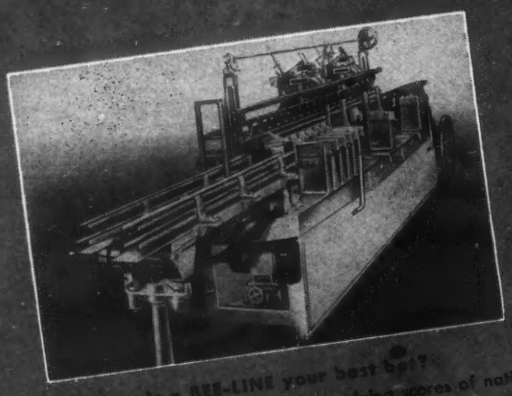

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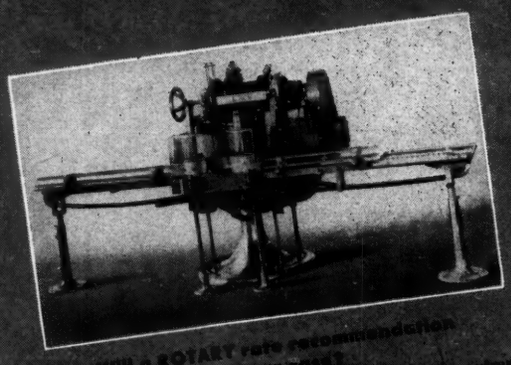

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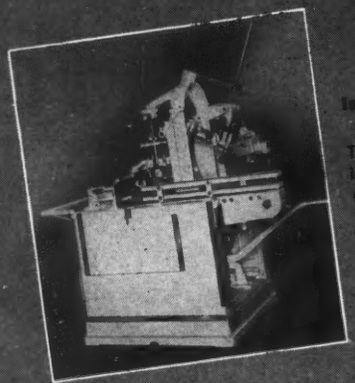

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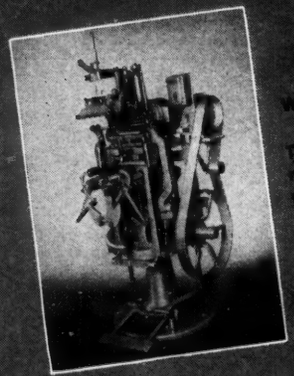

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FAO Might Save Us Money

The Food and Agriculture Organization—led by a super optimist, Sir John Boyd Orr—began its second convention in Copenhagen in September. Though FAO is unspectacular compared to the Paris "peace" conference or meetings of the United Nations at Lake Success, FAO has an importance equal to either of them. Perhaps it is even greater for a stable, disarmed world peace.

FAO is a planning group of representatives of the United Nations. It aims to devise a plan to keep world food production commensurate with world needs and to permit the requisite world wide distribution of food from the "have" nations to the "have nots." If FAO can devise a successful plan, if the plan can be sold to the UN, if member nations accept and implement the plan, if world agriculture keeps pace with demand, and if world population does not get out of hand—some very important ifs—the effect should be highly propitious for the much desired world peace.

The quest of man for his food is probably the most potent force in the unhappy history of the world. I regard it as surpassing the politico-economic ideologies whose conflict at the Paris "peace" conference has been so disturbing, for Communism finds few supporters where people have enough to eat. To me a well-fed world will be a world which has the greatest potentiality for peace. I do not, however, overlook the existence of adventurous men or nations who may embark on schemes of empire for the fun of it. But such efforts will gain few supporters where people are reasonably contented and reasonably well-fed.

Must Be Realistic

It is necessary, however, to be realistic. We must deal with the world as it is before we can make it over into the better world that we hope to see. I sat beside Sir John during a dinner meeting in July where the discussion was about the world food situation and learned from this likeable, humble man, that he recognizes the huge problems ahead but that, in his optimistic view, the statesmen of the UN can solve the problems if they are provided with a plausible, workable plan.

The first question that arises in the mind of any "have" nation's citizens is: Who is to pay for the food that they are to be asked to give to the "have nots?" If this means only who is to put up the cash, the answer is simple: The "haves" must do it. If, however, it means: what are the "haves" to expect as compensation for low cost food, the answer may be found in the field of statecraft and diplomacy. If, for example, the United States could be relieved of the need for a huge military establishment for national defense it would be far cheaper to give a lot of food away, provided we actually achieve national security thereby.

Peace Costs Money

As one of my friends in Australia has put it: "Peace costs money, but war costs infinitely more." Today, as a result of the latest war, I must now pay to my government in direct income taxes more than a third of every dollar I can earn. If my government can provide adequate national defense by the process of helping to implement the FAO plan at a cost to me of only one-fourth of my income instead of considerably more, then I am for it on purely selfish grounds. I believe anyone who thinks it through will reach the same conclusion.

The American standard of living cannot be achieved or even maintained where a huge standing army and navy must be kept in being, ready to defend the nation from aggression on an hour's notice.

When weighing the merits of the FAO planning efforts, let us keep in mind a few items of military cost. The overseas payroll of a single division in World War II was $800,000 a month. Add clothing and subsistence and the cost is well over $1,000,000 monthly. We need an army of about 50 divisions in these uncertain times. Long range bombers cost about $1,500,000 each. Large naval destroyers cost about $10,000,000 each. A battleship costs upwards of $100,000,000. Large aircraft carriers cost still more, exclusive of the planes. Each atomic bomb must cost at least as much as a battleship, if the development expense is included.

Either we must keep our military defenses intact and ready in these disturbing times, or we must find some cheaper substitute for their cost.

FAO may find the answer. If the answer is convincing and is cheaper than maintaining armed neutrality then all should support the proposal. Remember that "Peace costs money, but war costs infinitely more."

L. V. Burton EDITOR

The Talk of the Industry

• SPEAKING of electronics, one of the radioactively "hot" battleships at Bikini gave off so much radiation that in 24 hours aboard the ship a man would have been subjected to the equivalent of 1000 chest X-rays. One such procedure a day is usually regarded as the safe limit.

• INQUIRIES still come to our offices about various electronic methods of sterilizing foods against bacteria. As far as we know electronic sterilization is still in the future.

One reader asks about the use of X-ray for this purpose. Up to now it is not practicable to sterilize food by X-rays and we doubt if it could be economical even if it is possible.

• LAWRENCE C. LOCKLEY, Dupont's manager of market research, gave a fresh slant to an old thought at a New York luncheon meeting of the American Marketing Association, not long ago. He said that "marketing research can help—but cannot replace—the man with an idea. No market research man," he added, "would have encouraged 'Crazy Henry' Ford when he wandered Detroit's streets with his roll of blueprints. "Market analysts," he decided, "cannot measure dreams, but dreams have created jobs for market analysts."

This thought seems worth repeating for the benefit of everyone engaged in the food industry. With perhaps half the world facing varying degrees of actual hunger, with higher wages creating an unprecedented demand for food in our own country, and with the great wartime and postwar advances made, and being made, in all branches of food processing, there can be no question of markets. But the alert, recognizing the tremendous opportunities now in the lap of the industry, are more receptive than ever to the man with an idea.

• THE import of the meaning of full employment gradually emerges: There are not enough employees, of the sort vaguely classified as employable, to go around. A considerable number of those whom few employers enjoy having around must be hired, trained and integrated into the labor force and office force. It imposes a tough job on business to train the unlikely ones. But unless these can be put to work there are only two outs: an "all star" cast with payrolls too high for any profit; or a plant so short-handed that redueed volume makes for ditto.

• YOU have no idea of the questions that are fired at us. For instance, a chap telephoned a thousand miles to ask if we didn't think that $60,000 was too much for a freezing machine. When we asked how big it was, its capacity, did the price include compressors, condensers, receivers and piping, was it f.o.b. builder's plant or erected on the job—he had no idea. And all we could do was suggest that such data were pertinent.

Occasionally telephone inquiries come from the other side of the earth. The bulk of such inquiries, however, originate right here in U. S. A. Their volume is so large that we carry on the staff one food technologist to do nothing but dig up information and write letters. And most of the inquiries betray a woeful lack of knowledge of what it takes to succeed in the industry.

Try your hand at answering this one: "I contemplate moving to Long Island to raise ducks, and can or freeze them. Please send full particulars on locations, prices, and how to raise ducks. Also a layout of factory for same. Please include a list of the latest books on duck raising and packing. Thanking you in advance, etc." We have a form letter for this.

Not a day passes, however, without at least two like it. And, oddly, they come in streaks. A while ago frozen food stores were the happy prospect. Later it was precooked frozen foods. Next it was bubble gum. Just now the majority seems to want to make potato chips. If this keeps up we shall be forced to write a very elementary book about every sort of food processing and insist that inquirers purchase it.

Hors d'Oeuvres

• *A movie actress milked a cow in Times Square the other week. One eight year-old native New Yorker, watching the operation, wanted to know what they did with the cow "after they used it."*

• And speaking of milk, Borden's says that reporters at the Memorial Day auto race state that George Robson, the winner, was much more interested in getting a glass of milk, after the race, than he was in the $60,000 check. That's what Borden's says the reporters state.

• *Decomposition of one pound of uranium produces heat equivalent to 1,500 tons of coal. Trouble is the uranium producers are so coy about setting a price per pound for uranium. Also, up to now, the decomposing cannot be listed among the gentler arts.*

• GMA tells us that Slade' Spice Mill has been in operation since 1734. Then they add that "grocers still sell Slades spices." This will serve as our short short story for the month.

• *GMA also tells how a workman forgot to shut off his soap mixing machine while he went to lunch, back in 1879. That batch floated and thus Ivory soap made its appearance. OK, but how do they get the 0.66 percent impurities into the stuff.*

• Xose-1 is not the name of a new sugar, but of the Navy's new scout observation plane. Xose-2, a newer modification, is soon to be announced. We mention this just xose you don't get mixed up.

•*The National County Agent headlines a business item with "War Veterans Drifting Back to Farms." We know several who took a good look at city life and started back under full steam. There was no drifting about it.*

• It is to be hoped that you are getting prepared for things to come. The National Restaurant Association has decreed that the week of October 7-13 shall be national soup week. And right on its heels—October 12-19—comes the seventh national wine week with the slogan, "enjoy dinner with wine." It seems appropriate that October 27 is Navy Day.

J.A.J.J.

As in the case of most other undertakings, there are tried and tested ways of finding the job that is best suited to your qualifications. This article maps a program for seeking better-than-average employment in the food field

By AUSTEN STONE, Consultant, Philadelphia

GETTING a job isn't just a question of filling out an application form. Not if you want a better-than-average job, with better-than-average prospects for future development. Not if you are a man with a technical background looking for a place in the food industries. In such case, you'll need the knowledge that every successful fisherman has acquired—location of the best fishing holes, when the fish are likeliest to bite, and exactly what bait to use.

The purpose of this article is to set down concisely those things you should know about job hunting, and the steps you should take to achieve your objective. They will be discussed under three headings, (1) preparation, (2) actual search and (3) clinching the job.

If you are like most technical men, you probably do not realize when you go job hunting that you are engaging in a selling operation. The goods, commodities and merchandise you offer consist of your own skill, background, experience, training, mental bent and so forth. For the moment you have forsaken the technical field completely and have become a salesman. Don't forget this point, because it is extremely important. Job hunting is a purely sales activity. Making good on the job is something else again. Before you can eat rabbit stew, however, you must first catch your rabbits.

Prepare Yourself

Selling requires a knowledge of the goods to be sold, and a knowledge of the markets in which such goods are in demand, or would be in demand if properly presented. The situation is exactly the same when it comes to selling your abilities and experience to an employer. It requires *preparation* on your part.

Therefore, the first thing you must do is to examine yourself and see of what you actually consist in the way of marketable assets. What has been your experience? Your training? Your background? What is your major strength? Are you chemist, physicist, engineer, technologist, production man or administrator? Has the bulk of your activity been in special fields such as canning, preserving, milling, manufacturing, dairying or baking?

No matter what your main field has been, you are bound, if you are the usual person, to have had experience on a smaller scale in related fields. This experience can be, so to speak, of both the horizontal and the vertical variety—either spreading out over many areas, or upward through one business field. Most people have had both, though few stop long enough to consider what it can mean in the way of influencing a new job choice.

As an example of what is meant, take the case of the technologist who works in a baking plant. Perhaps he was originally trained as a chemical engineer and has charge of the company laboratory. His main field, of course, is baking technology. But consider what can happen even if that man never goes outside

that particular plant for experience. The nature of his work is going to take him into the production department for the major part of his time and consequently, he is going to acquire an extensive experience with raw materials such as flour, sugar and shortening as they pertain to the problems of the baking industry. He is, in other words, becoming an expert in the fields served by the technical sales service departments of the big raw material suppliers. He is certain to acquire supervisory and administrative experience in carrying through technical developments into full scale production operation. Packaging problems, production cost problems and management planning problems are bound to come his way. The extent to which he follows them up will determine his actual experience in such areas, but if he has been fairly keen it is obvious that the label "baking technologist" does not fully describe him as a marketable commodity.

That is what you must do as the first part of your preparation for job hunting. You must come to a full, accurate and fair estimate of what you have to offer. It is important not to underestimate and it is likewise important not to err in the other direction.

Put It on Paper

One of the best ways the writer knows by which to come to such conclusions is for you to sit down with a piece of paper and a pencil. Rule off five or six columns on the sheet. Head them respectively, Background, Training, Experience, Main Field, Minor Fields and Other Activity, for example. These headings are only suggested as indicative of the sort of thing that is wanted and if you want to use other terms that seem more apt, go ahead and do it.

But at any rate, enter in each column a short resume of just what has happened to you in each classification. Take some time on this phase of preparation. Think about yourself. By all means include everything of a business nature, but also do not neglect outside activities in which you are engaged, which can be of business importance. Skill in public speaking, for instance, could be one of these. In fact, skill in putting over ideas by means of either the written or the spoken word can be of value in a number of jobs.

By the time such an inventory is finished, you should have a very good idea of exactly what it is you have to sell. You may, in fact, be surprised that you have so much; or even, that you are lacking at points where you thought you were strong. The obvious answer in the latter case is to build up while you have the opportunity.

This method will work even if you are fresh out of school. It will work if you have recently been released from service with the armed forces—having gone into service, perhaps, with little job experience between the end of your schooling and the time of your induction. It will work for you just as well as it works for the man who has had extensive experience. The requisite to making it work for you is willingness to put effort into it—to decide what you have gained from the courses you took and from your service experiences. Like any other salesman, you must know what it is you have to sell. Don't be too quick to decide that you have nothing of market value on your shelves.

Study the Markets

Once you have done this much in gaining a knowledge of what you have to sell, your next step is to go on and develop a knowledge of the markets wherein this merchandise is in demand and can be readily sold at good prices.

Here, of course, it is highly desirable that you should have started to build a fund of information long before it is actually needed. Like insurance, it should be taken out before the event, and it should be kept up to date at all times.

What sort of market information is required for the man who wants to sell his services? You should know the answers to such questions as the following. What are the companies in your field and related fields where your skills and experience can be valuable? How much information do you have about these companies, their general policies and their future prospects? Who are the men who head these companies? Do you know what they are like? Are there new companies coming into your field? Are other, older companies outside your field contemplating expansions into activities that would make them interested in what you have to offer? Are there companies that are not interested in what you have, but should be, and possibly would be if you presented the matter to them in the right way?

How do you find out these things? Largely from the trade journals, business magazines, newspapers and talking to people who are in the field that interests you.

A partial list of journals and magazines of value in giving you such knowledge would include:

Food Industries, Food Field Reporter, Bakers Helper, Bakers Weekly, American Brewer, The Canning Trade, Manufacturing Confectioner, The Spice Mill, Chemical & Engineering News, Northwestern Miller, Ice Cream Trade Journal, Milk Plant, Creamery Journal, Fishing Gazette, Grain & Feed Journal, American Miller, The Glass Packer, Business Week, Nations Business, Fortune.

The use of the "Industrial Arts Index"—the reference room of any good-sized library has it—should not be overlooked as a source of previously published information about companies or industrial products. In "Moody's Investors Service," also to be found in the larger libraries, you will be able to get a great deal of helpful information about specific companies in your field.

It is not the purpose of the writer to suggest that you should read everything about every phase of the food industry. But it is strongly urged that you read regularly a combination, such as two journals giving wide coverage of the food industry, plus one or two dealing with your specific industry, and one or two of the business magazines. And above all else, either clip or make notes of information concerning men, jobs, companies, products or trends that appear to you to have value in enlarging your own fund of information.

Tread Softly

There is very little need to talk much to others about the purpose behind what you are doing, for while some employers approve of such interest, others definitely prefer to keep their own people more or less cloistered. Therefore, in this, as in so many other activities, it is much better to walk quietly, rather than to go making a loud noise about your doings.

By now you should know what you have to sell and also the markets wherein it can be sold. You come then to the second phase of getting a job. What has gone before was preparation and now you are set to look for the job.

As a general thing, there are four main avenues open to you. (1) You can work through a regular employment agency, (2) you can

advertise, (3) you can answer advertisements and (4) you can contact, preferably by letter, those companies that your study and information lead you to believe are likely to be interested in your experience and abilities.

If you are seriously interested in finding the job, you should use all four avenues, as well as any others that your imagination or contacts make available. The old Spanish proverb: "The dog that runs about finds a bone" fits your situation quite aptly.

Requires Effort

There are advantages and disadvantages in connection with each approach to job finding, however, and you should understand this in order to make the most efficient use of each method.

The employment agency, for example, can do nothing for you that you cannot do for yourself, provided you are willing to work at it. It will, moreover, charge you a fairly substantial fee for finding you a job. On the other hand, it does relieve you of some of the searching and contact making that otherwise you must do for yourself.

You can advertise. Choose the trade journals that reach the people who will be interested in what you have to offer. The newspapers such as The Journal of Commerce and the New York Times should also be considered. Make your advertisement concise, descriptive and with stress on the points that you know to be of value.

You can answer advertisements. They are to be found in the trade journals serving your specific field, or the general food field, or in the American Chemical Society publication, *"Chemical & Engineering News."*

This matter of answering an advertisement deserves some consideration. Most employers who have had occasion to advertise for technical help have commented on the poor quality of thinking shown in applicant's letters and a lack of good understanding of what is called for in answering an advertisement.

What is it you want to put into such a letter? For one thing, try to give concise and specific answers to the questions asked by the advertiser, even if some of them seem irrelevant. Quite often the employer asks for "details of experience, training, age and salary expected." When you answer, put yourself in the place of the man who ran the advertisement. He has to pay for every word in print, and the presumption, therefore, is fairly strong that he had a good reason for wording it as he did. Consequently, coyness on your part in not telling him the things he wants to know is not going to make a very favorable impression on him.

But while you should answer all questions, you must also try to use all your skill and imagination in interpreting your ability and experience to the prospective employer in this letter. You must figure out what points should be stressed in order to hit the note that will get attention, and an interview leading to a job. Again, remember that you are selling something and that your letter must present what you have to offer in such a way that the buyer—who is the employer in this case—can see that it is what he needs.

Writing the Letter

The fourth avenue by which to get yourself a job, and in the opinion of the writer, the one assaying highest in pay dirt, is by letter contact with those companies that your study and information lead you to believe are likely to be interested in your training and experience. It's job hunting without benefit of agency or advertisement. You must know your own abilities thoroughly and how they stack up with the requirements of various jobs in your own or related fields. You must know the companies who use such abilities sufficiently well to be certain of your ground. This time you are shooting at the target with a high-powered, telescopic sight rifle, but you are limited to one shot and one shot only. That's your initial letter—so you've got to make it good!

In this sort of letter writing, you must do all the things mentioned before. Make what you have to say brief and to the point, yet omit nothing that your study of the company has indicated should be mentioned. Be dignified in your letter. The job letter is no place for levity or "wise cracks." Always ask the man to whom you are writing to set a time that will be convenient for him to give an interview.

There is also the question of having your letter reach the right man, the man who can make a "yes" decision. Personnel heads and department managers all too frequently can make only "no" decisions, whereas executives on a higher level are more likely to be free to evaluate what you have to offer in terms of jobs that have not yet been created, but should be. Addressing your letter to the president of the company, and be certain to address him by name, correctly and completely spelled out, won't always get you "in," but the per-

(*Turn to page* 212)

Acme

Try to see an executive on the highest level as he will be in a position to evaluate adequately what you can offer and will have the authority to make a "yes" decision

New Devices Improve Cleaning And Effect Economies

Developed for use in dairies, these efficient aids should prove equally useful for cleaning equipment in many other food processing plants. They make the job less arduous, reduce losses and aid good housekeeping

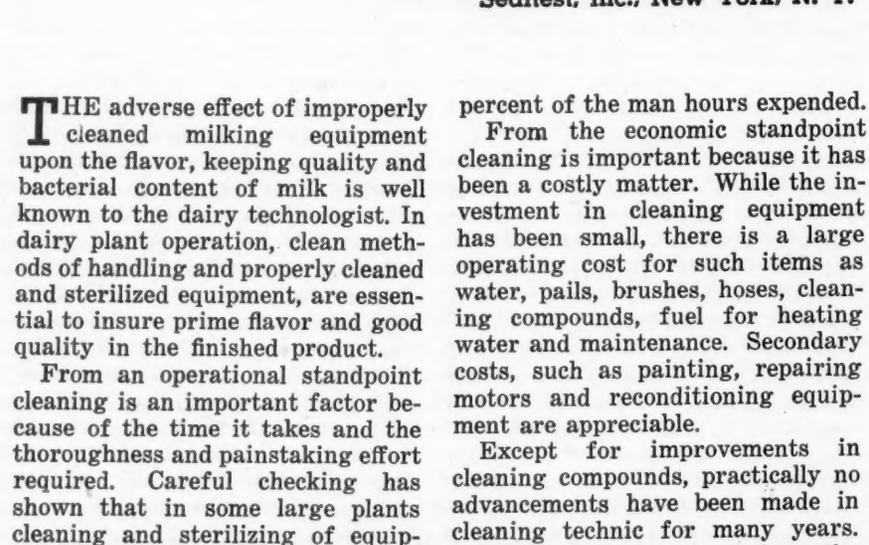
By JOHN R. PERRY, Assistant to the President
Sealtest, Inc., New York, N. Y.

THE adverse effect of improperly cleaned milking equipment upon the flavor, keeping quality and bacterial content of milk is well known to the dairy technologist. In dairy plant operation, clean methods of handling and properly cleaned and sterilized equipment, are essential to insure prime flavor and good quality in the finished product.

From an operational standpoint cleaning is an important factor because of the time it takes and the thoroughness and painstaking effort required. Careful checking has shown that in some large plants cleaning and sterilizing of equipment account for as much as 20 percent of the man hours expended.

From the economic standpoint cleaning is important because it has been a costly matter. While the investment in cleaning equipment has been small, there is a large operating cost for such items as water, pails, brushes, hoses, cleaning compounds, fuel for heating water and maintenance. Secondary costs, such as painting, repairing motors and reconditioning equipment are appreciable.

Except for improvements in cleaning compounds, practically no advancements have been made in cleaning technic for many years. The three mainstays have been the pail, the brush and the unwieldy, inefficient, free-running hose. Realizing this situation, Sealtest decided that the cleaning operation urgently needed attention. The writer was assigned to make an investigation with the following objectives: (1) To obtain better cleaning, (2) to achieve a neater and more orderly operation, (3) to make the job a better one for the workman, (4) to effect economies and to reduce wear and tear on equipment and plant and (5) to develop improved and more satisfactory cleaning equipment.



Water of a relatively low temperature and pressure, that flows from the specialized nozzle only when the lever of the quick action valve is depressed by the operator, eliminates the need for aprons and boots when rinsing equipment.

As the first step toward attaining the above objectives a study of cleaning methods, as carried on in several representative plants of National Dairy Products Corporation, was begun early in 1943. The methods employed were carefully noted and the features of cleaning equipment used were studied and critically appraised. Some practices could not be improved with the cleaning equipment that was available. It was evident that better facilities and equipment were definitely needed.

Once the essential facilities and the type of cleaning equipment needed were determined, their development was undertaken. This proved to be a tedious and trying, albeit interesting project. It was necessary to initiate a new approach to the cleaning operation; to determine what cleaning equipment should do to be satisfactory and then, without precedent as a guide, to design and build such equipment. Several special devices, designated as "New Cleaning Aids," have been developed by the writer. They have been found helpful in securing bet-

ter cleaning, conserving labor, fuel, water and cleaning compound; lessening wear and tear on equipment and plant; improving working conditions; and increasing the effectiveness of the workmen.

Warm Water Used

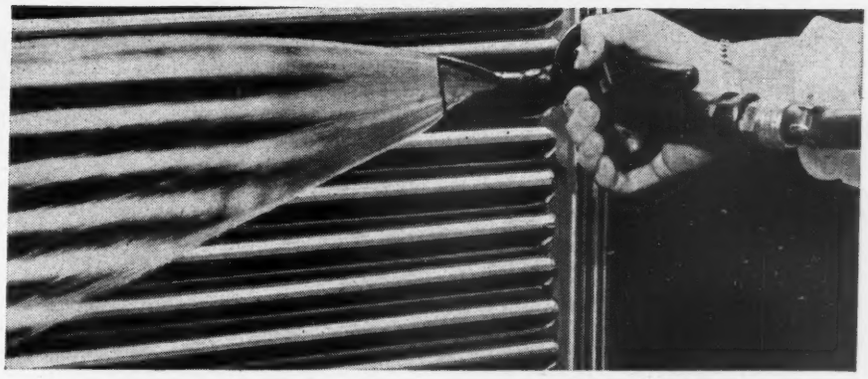
In the course of the study the need for water of the correct temperature for cleaning became manifest. Some plants were equipped with hot water systems, and hot and cold water at hose stations. In other plants cold water and high pressure steam were piped direct to hose stations.

To insure a supply of water of the proper temperature for cleaning and rinsing it was found necessary to have a hot water generator, equipped with a reliable and relatively sensitive thermostatic control. The reservoir-type generator has given good results. Inasmuch as water used in cleaning should have a relatively low temperature (115 deg. F. has proven satisfactory), and water with a fairly high temperature is also desired in certain plants, it was found advisable in some cases, to generate hot water with a controlled relatively high temperature. By means of specialized mixing valves, equipped with thermostatic controls, the hot water was then blended with cold water to supply water of the desired temperature at hose stations.

Observations showed that, when a hose station had both 115 deg. F. and cold water, the latter was seldom, if ever, used. Moreover, it was not desired to have the temperature of the issuing water reduced below 115 deg. for cleaning. Hence, in some plants the cold water supply at hose stations has been disconnected, and in one new plant a single water line has been piped to each hose station. Wherever there is need for hot or cold water in a plant, special lines supplying the kind needed may be installed. For a number of reasons, clean, relatively soft water is desirable for cleaning. In some cases proper water treating equipment is desirable and even profitable.

Shut-Off Valve Developed

An excess consumption of water in cleaning results from allowing hoses to run when not in use. Overrinsing and removing products from the floor with water are wasteful since a mop, squeegee or some such device could be used. To control the flow of water it was accordingly decided that some type of control device should be attached to the free end of each hose. Numerous types of quick action valves which could be attached to the free end of a hose, were tested. None, however, was found that was entirely satisfactory. It was necessary to design a suitable valve.



A quick action valve, equipped with a specialized nozzle that delivers a "blade" of water, instead of a round stream, is attached to the free end of the hose.

The "Shut-Off Valve" as finally designed and constructed, gives the workman control of the flow of water at all times. It is of the quick action type. Water flows from it only when the workman depresses the lever or secures the lever in the depressed position by means of a clip. The valve is equipped with a specialized nozzle which delivers a "blade" of water instead of a "round" stream. The blade of water, because of its form, rinses down and does not splatter. It uses a minimum of water. To protect processing equipment the metal valve is encased in a resilient tough coating that is securely attached to the metal.

Low Pressure Water

Low pressure water is required if a shut-off valve is to function satisfactorily. Pressure as low as 15 lb. per sq. in. has been found suitable and a pressure in excess of 25 lb. per sq. in. is undesirable and unnecessary. Low pressure water may be supplied to hoses by means of one or more large pressure reducing valves and adequately large supply lines to several hose stations or by means of small pressure reducing valves located at, or near, the hose stations. In plants already piped for water of normal pressure, it generally has been found more expedient and more economical to install pressure reducing valves at, or near, hose stations than to replace pipe lines.

When using water of a relatively low temperature and pressure, and with a shut-off valve on the end of a hose, it is not necessary to employ the cumbersome, heavy, ¾ in., so-called creamery hose. Instead, a light, flexible Neoprene coated, ½ in. hose is being used. This special hose weighs approximately one-third as much as a standard creamery hose and is quite easy to handle. Just how long this new type of hose will last is not yet known. Some of it is still in good condition after nearly two years of use. Because of its light weight and because only low temperature and low pressure water pass through it, the wear and tear on it are evidently less than on creamery hose that is used with high pressure hot water.

Experience of two years with the shut-off valve has shown its desirability, and acceptability to those who use it. In plants where it is in use the dry condition of floors, the absence of water being sprayed about and the virtual freedom of the air from moisture are notable. The shut-off valve practically eliminates splash, so that workmen, even when using it in close quarters, do not get wet and can dispense with aprons and boots. Where it has been used, substantial economies in water, fuel and maintenance costs have been effected. In one plant the saving in fuel alone paid for the cost of installing the shut-off valves and incidental equipment in a few months.

Cleaning Sanitary Pipe

During the study considerable attention was given to the cleaning of sanitary pipe. There was no really satisfactory equipment available. Cleaning was a time-consuming and laborious matter which, generally, was tough on the pipe. Careful examination of the existing equipment and of the methods of cleaning employed showed that a thorough cleaning job was difficult to perform. It was evident that there was need for a piece of equip-

ment that would properly clean and rinse sanitary pipe.

It was decided to design and build a cleaner that would properly scrub and rinse both the inside and outside of the sanitary pipe, and which would be so constructed that the pipe would not be scratched or otherwise damaged during the cleaning process. This called for considerable ingenuity, and its evolution involved a goodly amount of experimentation.

Pipe Cleaner Designed

The "Sanitary Pipe Cleaner," as designed and built, includes two elements, one for scrubbing and the other for rinsing. The scrubbing element consists of a brush, which cleans the interior of the sanitary pipe and an assembly of three brushes that scrub the outside. The internal brush is attached to the end of a shaft housed in a tube through which cleaning solution is fed to the brush. It is rotated by a slow speed motor that also drives the cleaning solution pump. The external brushes are so placed, that as they revolve they scrub the outside of the pipe with the tips of their bristles. These brushes, which are driven by a separate motor, can be adjusted to clean sanitary pipe of various sizes. Cleaning solution is fed to the external brushes from a perforated pipe that is mounted directly above them.

The excess cleaning solution, from the brushes and sanitary pipe, drops into a trough that carries it to the solution storage tank. The cleaning solution, maintained at the proper temperature by an electric heating element, is supplied to the brushes by a small centrifugal pump that is mounted behind and just below the solution storage tank. To avoid circulating the scum that accumulates on the top of the cleaning solution, the pump draws solution from a point near the bottom of the tank.

The rinsing assembly consists of a nonmetallic knob mounted on the end of a pipe through which water is sprayed onto the inside of the sanitary pipe, an external rinsing ring and a trough that carries the rinse water to the rear and through a drain pipe to the sewer. Warm water, controlled by a trigger assembly, flows only when the pipe is being rinsed. The water is delivered at an angle toward the rear of the element and flows from the pipe as it is retracted.

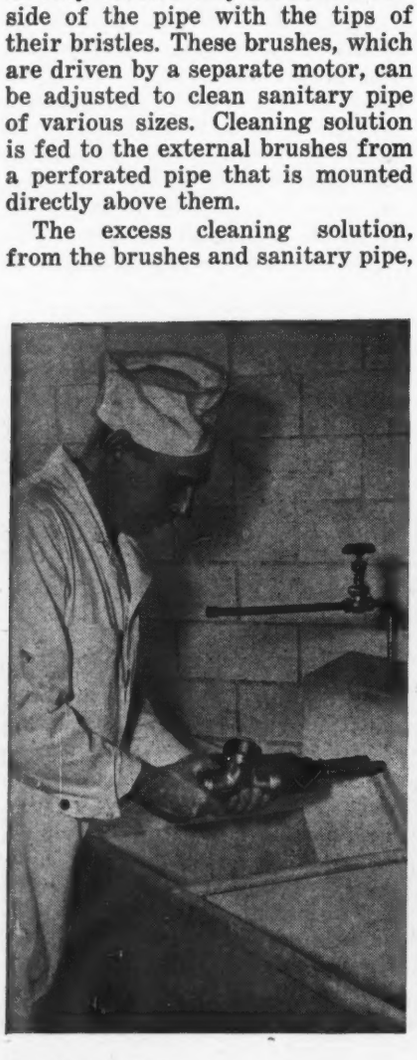
The entire working end of the sanitary pipe cleaner is covered. There are two openings in the cover, one in front of the brushes and the other in front of the rinsing assembly. The cover confines the cleaning solution thrown by the brushes and the rinse water, improves the appearance of the unit, and prevents the workman from striking the metal backs of the external brushes with his hand.

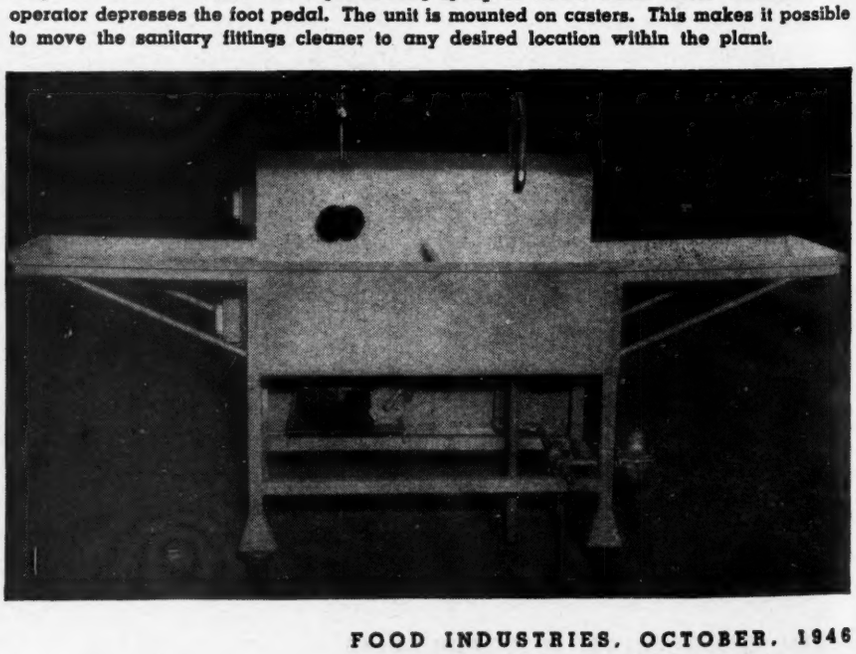
When operating the sanitary pipe cleaner, the pipe is brought to it preferably on a sanitary pipe truck. A length of pipe is removed from the truck, run through the brushes, retracted, then run through the rinsing sprays, retracted and replaced upon the truck. Two years of experience with this sanitary pipe cleaner have proven that it does a better job than any other piece of equipment known It is simple to operate, thoroughly scrubs and rinses, saves time, eliminates marring and scratching of sanitary pipe, and damage to ferrules.

Cleaning Sanitary Fittings

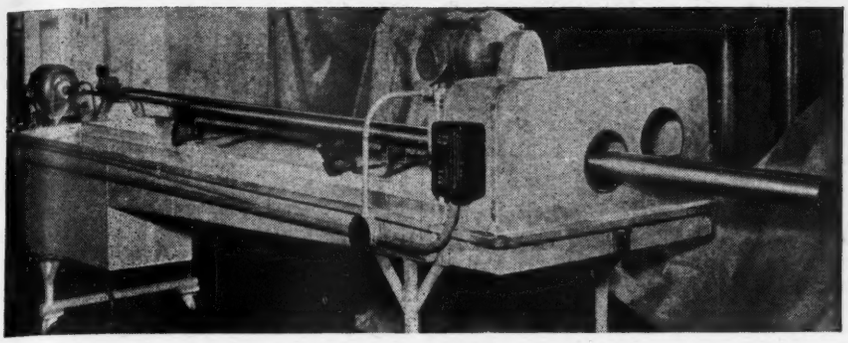
In a sizable plant there are a multitude of sanitary tees, ells, caps, bends, valves and other small parts, all of which have to be cleaned after each processing operation. During the study it was noted that there was no piece of equipment available that was specifically adapted for cleaning these parts. Sinks or vats, some with washing and rinsing compartments, and hand brushes were used. In some instances, single power driven bottle brushes were utilized. The sanitary fittings and small parts, were generally dropped or thrown into a vat of cleaning solution, then removed, one by one, and scrubbed with a hand or power brush. After scrubbing they were dropped or thrown into a vat of rinse water and later removed and racked or assembled.

It was decided to design a unit for cleaning sanitary fittings and

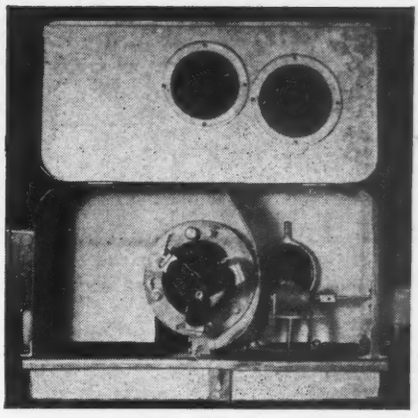




The Sanitary Fittings Cleaner has the appearance of a double wash sink, with a drain board on each end. On the left are two motor driven brushes for scrubbing fittings. Cleaning solution, pumped from the left compartment, is fed onto the brushes and fittings being cleaned, from the perforated pipe directly above. Fittings are rinsed by a special nozzle that delivers a penetrating spray of clean, warm water whenever the operator depresses the foot pedal. The unit is mounted on casters. This makes it possible to move the sanitary fittings cleaner to any desired location within the plant.



The Sanitary Pipe Cleaner has two elements, one for scrubbing and one for rinsing. The scrubbing element consists of a brush that cleans the interior and an assembly of three brushes that scrub the outside of the pipe. In the rinsing element, a non-metallic knob, mounted on the end of a pipe, rinses the inside of the sanitary pipe, and an external rinsing ring sprays the outside with clean warm water.



Cover of pipe cleaner is swung upwards to show arrangement of brushes and rinser.

small parts. The unit, which has been developed, consists of a scrubbing and a rinsing element. It has the appearance of a double wash vat with a drain board on either end. As one faces the unit, the scrubbing compartment is on the left and the rinsing compartment on the right. A back panel extends above the two compartments.

Above the scrubbing compartment and extending out from the back panel are two brushes in the same horizontal plane and close enough together so that their bristles mesh. These brushes rotate, the one on the right counter-clockwise and the one on the left clockwise. Above the line where the bristles of the brushes mesh and extending out from the back panel is a pipe that is perforated on the under side. Cleaning solution pumped from the compartment below drops from the perforated pipe onto the brushes. The cleaning solution is maintained at the desired temperature by means of an electric heating element located in and near the bottom of the compartment. It is protected by a perforated, removable, false bottom. The pump and brushes are operated by a small motor located below and to the rear of the compartment.

Above the rinsing compartment is a specialized rinse nozzle that delivers water of the proper temperature in a penetrating spray. The flow of water is controlled by means of a foot actuated valve.

Sanitary fittings to be cleaned are moved up to the "Sanitary Fittings Cleaner" on a sanitary fittings buggy, a specialized tray, or even by hand, and deposited upon the drainboard on the left. The workman then turns on the motor and begins cleaning. He takes a sanitary fitting in his hand and runs it over one of the two brushes turning it first one way and then the other against the second brush so that the fitting is scrubbed both inside and out. Cleaning solution is delivered from the perforated pipe directly onto the brushes and fittings during cleaning. A large sanitary valve body can be run over both brushes to scrub the inside and then be held against the brushes to scrub the outside. It is possible to scrub virtually any sanitary fitting provided that it has an opening at least one in. in diameter. Separate specialized brushes are necessary when cleaning the inside of sanitary fittings or small parts with openings less than one in. in diameter.

After a sanitary fitting has been scrubbed the workman removes it from the brushes and moves it to the right and under the rinse nozzle. He then depresses the foot-pedal with his right foot and a spray of tempered fresh water rinses the fitting. After rinsing, the sanitary fitting is placed upon the drain board at the right and later either racked or reassembled. Where this equipment is properly used, sanitary fittings are really cleaned. The amount of rinse water used is small because water with low pressure is utilized and the nozzle delivers a penetrating spray with a high rinsing efficiency.

Separator Discs

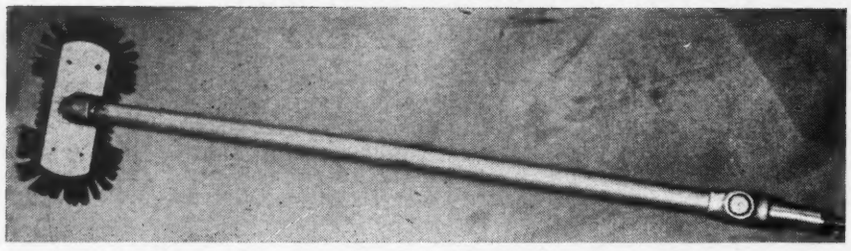
The cleaning of separator and clarifier discs has long been a laborious and unsatisfactory process. A device for cleaning them, however, which seemed to have good possibilities, had been developed and offered to the industry. Study and testing of this device indicated that it was basically sound in design. Certain changes were suggested to the manufacturer and several units have been built in accordance with these recommendations. These "modified" units are now in use and are doing a satisfactory job of scrubbing and rinsing. It is possible, however, that a few more minor changes in design may be advisable.

Disc Cleaner Described

The modified "Separator Disc Cleaner" has two compartments, a scrubbing and a rinsing compartment. The scrubbing compartment is on the right and the rinsing compartment on the left. Attached at the back left corner is a movable rod on which the cleaned discs are hung. Two brushes with short stiff bristles are mounted over the scrubbing compartment at such a distance apart that the bristles of the brushes just meet. The rinsing compartment is equipped with three nozzles, one above the compartment and two in the compartment. These rinse nozzles are of such design and so located that by passing a disc between them it is completely rinsed.

Discs to be cleaned are placed at the right of the unit on a special truck or carrier. After turning on the motor, the workman grasps a disc with his right hand and inserts it between the two brushes that spin the disc as they scrub it. After the disc has made a complete round the workman removes it from the brushes with his left hand, passes it through the sprays and places it on the rod which serves as a rack.

In a dairy processing plant there is a large amount of surface, in addition to that in sanitary pipe, sanitary fittings, and small parts, which must be cleaned daily. Some of this surface is flat or gently rounded, as in vats and product



The Solution Fed Brush is made of light-weight metal, with synthetic bristles. Cleaning solution, from a cleaning solution unit, is fed through the brush handle.

storage tanks. Some is ribbed as in the case of surface coolers and plate heaters, and some is tubular. With the exception of the tubes in internal tube heaters and coolers, in the cleaning of which power driven brushes are sometimes used, these surfaces are generally scrubbed with wooden back brushes. During the scrubbing the brushes are dipped into cleaning solution, either in pails or in the equipment being scrubbed. The brushes retain some of the solution among the bristles, but the amount carried is small and the dipping must be repeated frequently. Scrubbing in this manner is often a constant "setting up exercise," which is fatiguing to a high degree. It is also awkward, hazardous and wasteful of cleaning solution. Inefficient scrubbing may result and the temperature of the cleaning solution drops below that required for best results.

The design and construction of brushes used for scrubbing dairy equipment are frequently poor for the work to be done. Some brushes pick up cleaning solution fairly well but swab rather than scrub, while others scrub well but will not pick up cleaning solution satisfactorily. Brushes are frequently equipped with poor quality bristles or with bristles that are poorly secured in the heads. Many of the brushes used are short lived and must be frequently replaced.

Brushes Important

It soon became evident that brushes were of great importance and that specifically adapted ones were desirable. A brush was designed that would properly scrub certain pieces of equipment. This brush had a good quality wooden brush head and tough, enduring bristles of a synthetic material. Since the bristles were virtually impervious, and spaced so as to permit good scrubbing, the brush would not satisfactorily pick up cleaning solution. This handicap was overcome by devising a dispenser, consisting of a container equipped with a small, light weight hose and shut-off valve that delivered cleaning solution in the form of a blade. Pressure was maintained by means of compressed air and the temperature was kept at the desired point with an electric heater. By holding the small shut-off valve in one hand and the brush in the other hand, and by flowing cleaning solution onto a surface as it was being scrubbed, a good job of cleaning was accomplished. This method meant, however, that both hands were used and it could be utilized only with hand brushes or brushes with short handles. Nevertheless, scrubbing in this manner proved to be eminently satisfactory for outlets, thermometer openings, cooling coils in product storage tanks, etc.

Solution-Fed Brush

In order to permit proper scrubbing, where a brush on the end of a "two-handed" handle was needed, and to facilitate scrubbing with a hand brush where a long period of scrubbing was involved, a "Solution-Fed Brush" was designed. The first brush of this type was for cleaning the inside surfaces of product storage tanks. This brush, with the exception of the bristles and the valve in the handle, is made mainly of light-weight metal, and is of the T-head type. The bristles, of a synthetic material, are of the proper length and diameter, and so spaced as to permit good scrubbing action. The brush head is so made that worn out bristles can be replaced with new ones. The cleaning solution is delivered through the handle to the brush head, which it leaves through orifices so located, that the brush moves back and forth in a bath of cleaning solution. The flow of solution is controlled by a specialized valve in the handle that is operated by a button. The original brush has been used for a year, and a second one for several months, both with excellent results.

Cleaning product tanks at railheads presents a problem in many cases. For this purpose we plan to build a special unit consisting of a solution tank, a two-handed solution fed brush and small shut-off valve, mounted on a truck. This will be plugged in at the railroad yard when used for cleaning tank cars.

A hand solution fed brush has been built and tested experimentally. It is intended for scrubbing surface coolers, heater plates, the inside of vats, where the workman goes in to scrub them, and similar equipment. This brush is equipped with stiffer bristles than the one used for cleaning the inside of product storage tanks. It is also made of light-weight metal. The flow of cleaning solution is controlled by pressing, with the fingers or thumb, a small plate that operates a valve located in the brush head.

Still another solution fed brush is being built. It will be similar to the one used for cleaning the inside of product storage tanks but will be lighter and have shorter, stiffer, differently spaced bristles. This brush is designed for cleaning vats without getting into them, or for high coolers. It is still in the developmental stage.

Cleaning solution is fed to the solution fed brushes from a "Cleaning Solution Tank Unit" through small lightweight hoses. This unit is either portable or stationary depending upon plant conditions. It is equipped with an electric heating element that maintains the desired temperature. Air pressure is used to force the solution through the hoses to the brushes.

The solution fed brush makes possible satisfactory scrubbing in a bath of cleaning solution of the proper temperature. When this brush is used a substantially smaller quantity of cleaning compound is consumed and the strength of the cleaning solution is kept within desired limits. Experience has shown that despite the relatively high initial cost of the solution fed brush its use reduces brush costs.

Other Brushes

Two other specialized brushes have been designed in addition to the solution fed brushes, one for cleaning the inside of sanitary pipe, and the other for use with the sanitary fittings cleaner for scrubbing sanitary fittings. Both of these brushes are of the refillable type and are equipped with bristles of a synthetic material.

The newly designed brush for

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Non-Enzymatic Browning

Army research stimulated interest in the browning reaction in foods. Here is a digest of papers prepared for a symposium at the September meeting of the ACS. Sometimes the browning reaction improves flavor

CURRENT interest in the non-enzymatic browning type of reaction is indicated by the fact that an entire day was set aside on the program of the Division of Agricultural and Food Chemistry, at the recent American Chemical Society meeting in Chicago. There were eleven papers on various aspects of the subject, covering dried fruits and vegetables, malt and dairy products and cereals. J. H. Nair, of Continental Foods, acted as chairman of the symposium.

Controlling Browning

The subject was introduced by M. L. Anson, of Continental Foods, Inc., Hoboken, N. J., who reviewed the problems which were encountered in the course of Quartermaster Corps operations. Dr. Anson pointed out that methods have been developed for preventing non-enzymatic browning of foodstuffs. Browning of this type was a cause of deterioration of army dehydrated foods in storage, and became more serious with foods shipped to Pacific areas where they were stored for a long time at high temperatures. Work sponsored by the U. S. Army Quartermaster Corps resulted in products of increased stability.

Control of browning was achieved by drying to low moisture, addition of sulfite, regulation of storage conditions and in the case of potatoes, by drying potatoes with low glucose content. A study of the effect of moisture, temperature, oxygen and sulfite on the browning of dried apricots was made by changing one variable at a time. Results showed that apricots should be dried to a higher moisture than was previously thought desirable and that suppression of the oxidation of sulfite is better achieved by the elimination of oxygen. A new type of browning was discovered to take place in the lipoid phase of dried eggs.

S. M. Cantor, Corn Products Refining Co., Argo, Illinois and C. D. Hurd, Northwestern University, discussed the following three types of sugar reactions that produce colored endproducts: (1) Reactions of sugar alone in acidic systems, (2) in basic systems and (3) between sugar and nitrogen containing substances like amino acids.

Flavor Improvement

Basic research on browning, covering test tube reactions between amino acids and aldehydes, indicates the reaction proceeds stepwise. This was disclosed by M. Barnes and C. W. Kaufman, of General Foods Corp. The "off-flavor" character developed is not always the same and is dependent upon the amino acid used. It is believed that the desirable flavor of toasted cereal, roasted coffee and caramelizing milk may be attributed to such reactions. Positive contributions of the reaction to food flavors may be as important as control of its objectionable aspects.

Dehydrated Vegetables

Storage temperature and moisture content are the most important factors governing the rate of browning of dehydrated vegetables, according to the paper of R. R. Legault, W. F. Talburt, A. M. Mylne and L. A. Bryan, Bureau of Agricultural and Industrial Chemistry, USDA. Sulfite tends to protect against browning during dehydration and storage. Moisture content and temperature govern the rate of disappearance of sulfite.

Malt Products

In the production of barley malt, color and aroma are associated with carbohydrate - protein interactions, it was stated by S. A. Morell, Pabst Brewing Co. In brewing, the melanoidin reaction must be taken into account throughout the entire process. If the browning reaction proceeds too far in malt sirups, it can lead to "chemical fermentation" during storage. The pleasant malty flavor in malt extracts and sirups seems to occur during heating or roasting.

Dried Fruits

It was indicated by E. R. Stadtman, also on the program, that SO_2 retards browning in dried fruits. During storage the SO_2 is converted into a carbohydrate derivative with strong acidic properties. The salts are stable, but concentrated acid solutions darken rapidly. Apricot concentrates, with sugar removed by fermentation, do not darken as rapidly as unfermented samples. When fructose or glucose were added to fermented samples, darkening took place at normal rates. Analysis of extracts from stored apricots revealed substances identified as furfuraldehydes. When hydroxy methyl furfural was added to apricot sirup, the rate of darkening increased. Furfurals are important intermediates in the browning reaction, and as long as they are removed, darkening proceeds slowly.

Sugar Manufacturing

F. W. Zerban, New York Sugar Trade Laboratory, stated that in the manufacture of cane and beet sugar coloring agents formed which contribute to browning are: (1) Caramel substances, consisting of complex sugar anhydrides; (2) melanoidins, formed by the action of reducing sugars with amino acids and their amides; (3) iron compounds of polyphenols. Methods are used to reduce the formation of these coloring matters during manufacture or to remove those already formed. Dark coloring matters formed during the process have the following detrimental effects: (1) they are objectionable in sirups sold for food purposes, (2) they slow up crystallization of sucrose and are

(*Turn to page* 226)

Frozen Foods Defrosted By Electronic Heat

By the application of dielectric heat, frozen eggs are defrosted as needed, without an increase in bacterial count. Frozen fruits are thawed in a few minutes, without loss of quality, or discoloration due to enzymatic activity.

By W. H. CATHCART, National Bakery Division Laboratory
The Great Atlantic and Pacific Tea Co., New York, N. Y.

ELECTRONIC heat is applied in two distinct forms: (1) Induction heating, which is used in heating metals and (2) dielectric heat, used to heat nonconductors or dielectric materials, such as plastics and foods. The difference between dielectric and conventional heating is that the former has the ability to convert each interior particle of a material into a tiny heating element which, in addition to becoming heated, transmits heat to adjacent particles. Heating is therefore uniform throughout.*

As a general rule, electronic heating is an expensive form of heat generation and should be used only for a process that cannot be performed as well by means of a more common, and cheaper, source of heat. There are, however, applications in which dielectric heating will accomplish results that are unattainable by any other method. Defrosting of frozen products, such as eggs, fruits and vegetables are examples of such applications.

Products to be frozen are selected for their high quality, and in the case of fruits and vegetables every effort is made to harvest them at the proper time. Yet, when it comes to defrosting, long periods have been required to change these products into a usable state. In many cases, during this period the quality of the product is impaired, and in some cases it is made usable. For example, freestone peaches discolor during normal defrosting due to enzymatic activity. Eggs on the other hand, increase in bacterial count. In an effort to develop a method of defrosting, not subject to these disadvantages, research was carried out with high frequency heating. Experiments were conducted with a 5 kw. output radio frequency unit manufactured by the Federal Telephone and Radio Corporation, using frequencies of approximately 15 megacycles.

Defrosting Eggs

An ideal arrangement for defrosting eggs would be one in which bacterial multiplication is prevented and the activity of enzymes reduced.

Consider the methods that have been used for defrosting eggs in 30-lb. cans:

1. Thawing in a special container of water at 60 deg. F., the cans being given a reciprocating quarter turn every second. The time required is seven hours. At the end of this time the eggs are liquid and of uniform consistency but the increase in bacterial count is about 40 percent.

2. Defrosting in running water at 60 deg. F. This takes 15 hours. The thawed eggs have a moderately thick body and an increase in bacterial count of about 225 percent.

3. Defrosting in air at 70 deg. F. This takes 36 hours, and the resulting product is thick and pasty, with an increase in bacterial count of about 750 percent.

4. Defrosting in air at 80 deg. F. This requires 28 hours and results in a thick, pasty product with an increase in bacterial count of approximately 1,000 percent.

5. Defrosting in a refrigerator at 45 deg. F. Time for this is 63 hours. Bacterial count increases about 225 percent and the thawed eggs are extremely thick, pasty and lumpy.

With any of the above methods it is necessary to start the defrosting a considerable period of time prior to using the eggs, with the result that some of the defrosted material may stand around for several hours. Thus, the increase in bacterial count, in many cases will be greater than the figures given.

With the exception of No. 1, the methods given above leave a great deal to be desired. To prevent changes in the consistency and bacterial count it is necessary to defrost eggs quickly and uniformly. By using high frequency heating it was found possible to defrost 30 lb. of eggs in a few minutes, and to keep the bacterial count well below that of Method No. 1. In commercial practice this means defrosting the eggs at the rate at which they are being used.

Advantages Gained

The advantages of this method are: (1) Since the eggs are defrosted just as needed there is no loss due to spoilage; (2) space is conserved in the manufacturing plant, and in some cases, less labor is needed and (3) it enables a cake bakery to become more flexible in its production, without the danger of having insufficient eggs defrosted or of having thawed eggs unused and spoiled. When using this method, a freezer storage should be available at the point of defrosting in which to store a supply of frozen eggs.

Of the various products that have been defrosted experimentally frozen whole eggs were the most difficult. Frozen sugared yolks and

* For a more complete discussion of the principles of electronic heating see FOOD INDUSTRIES, April, 1946, and June, 1946.

frozen egg whites were defrosted with little trouble. Whole eggs are a mixture of yolks and whites, which have different properties. One of the main difficulties with them is what is known as "skinning effect." That is, the bulk of the power flows over the surface of the mass causing cooking on the outside while the inside is still frozen. To overcome this skinning effect it is necessary to defrost at a somewhat slower rate than in the case of frozen fruits.

Eggs were defrosted in fiber board cartons and also after removal from the containers. When defrosting large (20 lb.) containers some cooking was always experienced. This was due to the fact that the carton heated more rapidly than the frozen mass. It was possible, however, to hold this cooking to a point where it was negligible. If defrosting is to be done in the container it will be necessary to develop cartons that will not heat in the high frequency field.

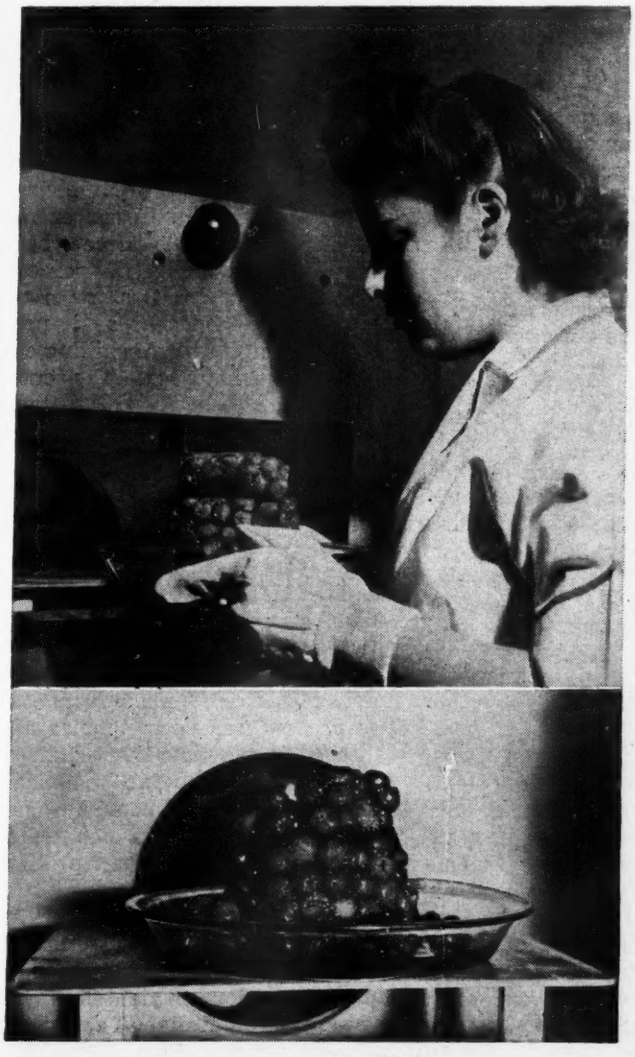
When defrosting eggs out of the container, the arrangement of the electrodes is very important. Electrodes should be so arranged that the eggs can drain away as they melt. It is possible to defrost a 20-lb. block of eggs in 15 minutes, while the same weight, when melted in the container, will take at least ½ hour.

No Bacterial Increase

Tests conducted with frozen whole eggs showed that they could be defrosted, either in or out of containers, without an increase in bacterial count. Eggs that gave counts of 400 bacteria per ml. immediately after breaking gave counts of 250 to 270 respectively when thawed in and out of the containers in which they were frozen. It must be remembered that the thawed eggs are readily contaminated, and should be used immediately upon defrosting in order to retain the benefits of electronic defrosting.

Defrosting experiments were conducted on a wide variety of frozen fruits, vegetables and fish, with considerable success. Fruits were defrosted in different sized units ranging from 1 to 30 lb. All units were rectangular in shape. Some were defrosted in the containers and others after being removed. Pound packages were defrosted in one minute or less, while the 30-lb. cartons required about 15 minutes. Fruit covered with sirup defrosted more rapidly than that packaged without. With all frozen fruits defrosting was quite rapid.

When defrosting frozen food materials, the heating at first proceeds swiftly. This decreases, however, as the solid is converted to a liquid, with a consequent change in the amount of power put into the material. The melting is most rapid at the ice crystal interfaces. From the practical standpoint, it is desirable in most cases to use dielectric heat to break the product down into smaller pieces, but not to attempt to remove every bit of ice from it, or to raise the temperature of the defrosted mass.



(Left, top) A 3-lb. block of frozen cherries being placed between the electrodes of an electronic oven.

(Left, lower) Cherries, shown between the electrodes, are partially thawed after six seconds of treatment.

(Above) After 15 seconds in the electronic defrosting oven the cherries are ready for use. Note absence of ice.

Development of Food Products in Wartime Germany*

Fats and oils processing, egg dehydration, flour milling, bread baking and the manufacture of proteins from molds are reviewed here by the author, who was a member of the U. S. Army Food Intelligence Mission

By GEORGE T. CARLIN, Chicago, Ill.

THE history of the German fats and oils industry during the war is a history of shortage. The German supply of vegetable oils has always been imported. Fats on hand at the outbreak of war were approximately normal. From the very beginning it was necessary to ration commodities made from fats. Since most pork fat is consumed in the form of sausage, very little lard is produced in Germany. Butter, however, is of extreme importance and constitutes approximately 50 percent of the total fat consumed by the German people. Per capita fat consumption very closely approximates that of the United States.

Margarine Industry

A very large margarine industry exists in Germany. This industry ranks next to butter as the largest source of all German edible fats. Prior to the war, cottonseed oil, peanut oil, cocoanut oil, sesame oil, palm oil and others were preferred. Soybean oil and rapeseed oil were used in small percentages in the margarine blend but were not highly prized. The Germans encountered difficulties of flavor reversion with these two oils and preferred to avoid their use when given the choice. At the outbreak of war, all importation of seeds ceased and the Germans were then dependent upon rapeseed oil.

Margarine manufacture was conducted in Germany on a high plane. The equipment in most cases was in very good condition and of high quality. All German margarine manufacturers deodorized their own oils. Most of them refined as well as deodorized. The hydrogenated fraction of the margarine was produced in a central hydrogenation plant but was re-refined and deodorized at the individual margarine factory before use. Because of this practice, flavor reversion difficulties were held to a minimum, even when the margarine was made out of 100 percent rapeseed oil. The only anti-oxidants in use were the organic acids, such as: citric, lactic and phosphoric.

Continuous processes for manufacture of margarine were not favored in Germany. In only one instance was continuous processing encountered. The German margarine manufacturers were prejudiced against such machinery because they could not duplicate the texture of butter using rapeseed oil in combination with continuous processes. They thought such methods would become popular as soon as some of the lauric acid oils became available.

Milk Products

The German dairy industry was modern in equipment and efficient in operation. Here again the natural care taken by the farmer gave the dairy a head start over American plants. Milk was delivered only in the form of whole milk within 24 hr. after production. The naturally cool climate aided the farmer in keeping the milk at extremely high quality.

Two methods had been developed in Germany for the continuous manufacture of butter.** One method was developed by the Roth Manufacturing Co. and was called the Fritze method. Through the use of this method, 45 percent butter fat cream was run through a high-speed agitator at carefully controlled temperatures. This resulted in the breaking of the butter fat-water emulsion and complete separation. The Fritze method gave very high speed production.

The second method was known as the Alfa process, developed by the Bergedorf Iron Works of Hamburg. This process required the concentration of cream to an 80 percent butter-fat content. The 80-percent cream emulsion was then reversed by a chilling treatment as it progressed through several chilling cylinders. The Alfa process was somewhat slow but it had the advantage of producing products of superior keeping quality.

Synthetic Fats

Of especial interest was the synthetic fat produced in the Ruhr Valley. The Markisch Soap Works at Witten owned a margarine factory which produced approximately 400,000 lb. of margarine per month from synthetic fats made from coal. The process was very complex and appeared to be expensive. The coal was first coked and then manufactured into carbon monoxide gas. The CO was then hydrogenated in contact with either cobalt or iron. This resulted in the formation of hydrocarbons and waxes of varying chain lengths. These hydrocarbons were first separated into their more volatile fractions, which were used for synthetic gasoline. The less vo-

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* Based on an illustrated talk given to the Chicago section of the Institute of Food Technologists. The first part, dealing with meat packing, was presented in the July, 1946, issue of Food Industries.

** Details are omitted here in view of a full discussion of the German continuous buttermaking machines in an article by A. V. Gemmill which appeared in the June, 1946 issue of Food Industries.—The Editors.

latile fractions were separated by means of distillation and were then oxidized by blowing with air for 24 to 30 hr. in the presence of potassium permanganate. This oxidation resulted in the formation of fatty acids. The formation of fatty acids and separation from the unoxidized material proved to be the key to the whole process. The fatty acids were then re-distilled, esterified with glycerin, refined, deodorized and processed into margarine in exactly the same manner used for fats and oils. Samples of the margarine were examined and found to be of good quality. Of special interest to nutritionists is the fact that the fatty acids formed by means of this synthesis consisted of both odd- and even-numbered carbon lengths. Fatty acids of a carbon chain length of 10, 11, 12, 13, and on up to 20 were used for edible purposes. Since the odd-numbered fatty acids do not exist in nature, there was some thought that the human body could not assimilate them. Tests made by German nutritionists, however, indicated that they not only were assimilable but were desirable, especially for diabetics.

Eggs

Eggs were dehydrated on a rather small scale in Germany for use by the German navy and for hospital use in Africa. The Kaffee Hag Co. of Bremen turned out to be the most important egg dryer. They were using a spray-type dehydration apparatus which had been originally designed for the drying of soluble coffee. Since coffee was not available in Germany during the war, the dehydration equipment was used for eggs. Specifications covering German dehydrated eggs were quite reasonable. Egg selection was conducted largely by organoleptic means. Bacterial counts were made approximately from once a week to once a month. The egg selection problem was made much simpler, however, by the natural carefulness of the German farmer. The Kaffee Hag people did not know what I meant when I asked a question about dirty eggs, cracked eggs and checks. They simply did not have to worry about the grading of eggs except the examination of product for offensive odors.

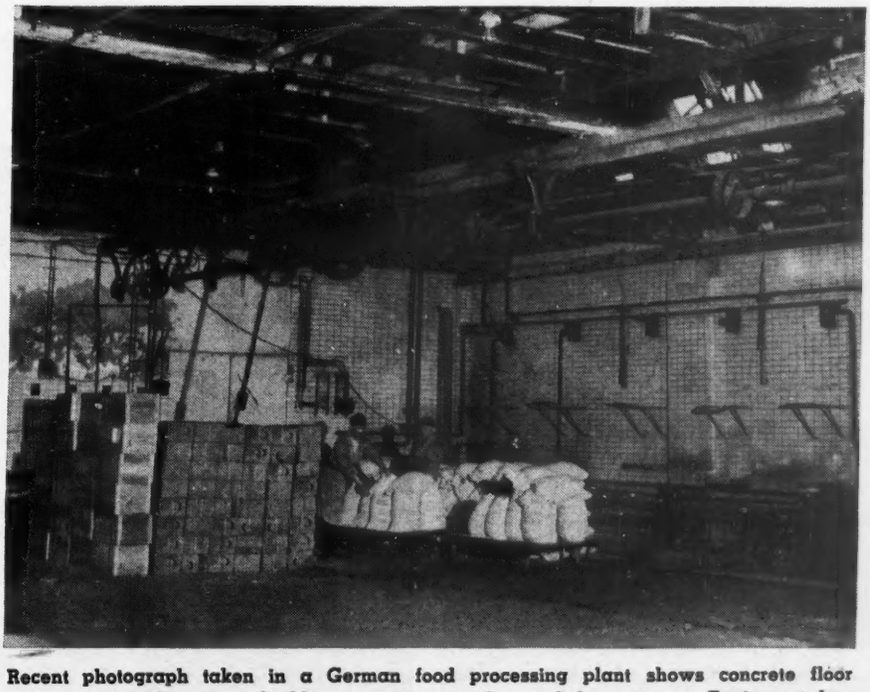
The eggs were dried at very low temperature through the use of a large volume of air. The rate of egg product yield per hour was much too low for American industry. The finished egg powder was dried to a moisture content of 1.5 percent. It was partially cooled and then packaged in an aluminum-paper fiber-laminated carton. Because of the low moisture content and also because of low storage temperatures, the product retained a fresh flavor for prolonged periods. Dehydrated eggs taken from a submarine and known to be more than six months old were just as good in every respect as the best American product. Kaffee Hag claimed to have dried Chinese frozen eggs which had been frozen more than six years prior to dehydration. They stated that products made from these eggs were definitely superior to anything they produced during the entire war.

Spray nozzles of the egg-drying equipment contained synthetic ruby gaskets. It was claimed that the nozzles would last for months because of the hardness of the synthetic ruby.

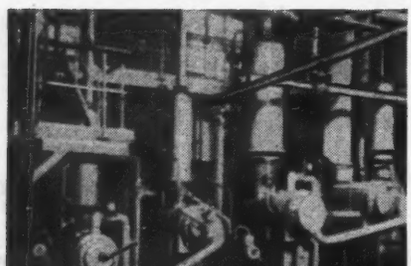
Protein from Molds

A number of miscellaneous food products were of possible interest to American manufacturers. Nearly the entire production of textiles in Germany was on the basis of a synthetic fiber made from wood cellulose. In the primary stages of textile and paper manufacture, wood chips were treated by means of the well-known sulfite process. The acidic sulfite waste liquors contained approximately 4 to 5 percent sugar. The acid was neutralized with lime and ammonia. The neutral liquors were then sterilized and inoculated stepwise with *Oidium lactis* mold, beginning with a culture grown in a 2-liter flask and ending in a large tank holding 50,000 liters. The mold grew prodigiously and yielded a cream-colored product which could be removed from the liquors by means of direct filtration. This product was salted, spiced and stuffed into casing, was smoked and then sold as ersatz sausage. Its solid materials were composed of more than 50 percent protein of very high biological value. I thought its flavor superior to some of the yeast preparations marketed in this country.

Protein materials of this type were also made by inoculating the same liquors with *Torulae* yeast. This method was not popular in Germany because of growth difficulties. It was claimed that the mold *Aspergillus niger* gave much better yields than any other organism. Since its color was an objectionable black, it had not been used for edible purposes. The Germans thought well of this biological process and felt that it would be continued in the post-war world, not in the production of human food, but in the production of high protein supplements for livestock. It was stated that this method offers the only known way of cleaning up paper mill waste liquors at a profit.



Recent photograph taken in a German food processing plant shows concrete floor and sanitary tiling in a building now apparently used for storage. Equipment has been removed. Note old fashioned line shaft and open ceiling construction.



Fatty acids distillation unit at the synthetic fat plant of I. G. Farben

Ersatz Coffee and Spices

Ersatz coffee and spices were made from a roasted grain base, principally rye or mixtures of rye and barley. The grains were first swollen by treatment by steam and were then roasted until of proper color. In the "coffee" mixture, chicory and sugar beet were used. In the "spice" mixture, the roasted grains were treated with various essential oils or blends of essential oils and synthetic materials. To get a more natural appearance in synthetic pepper, 50 percent ground prune pits were used as carrier for the capsicum in combination with 50 percent roasted rye. Bran fragments were also used to produce an appearance similar to that of black pepper. Natural oil of pepper was blended in many cases with capsicum to produce a fancier product. A good grade of synthetic cinnamon was produced by impregnating the processed rye and barley with cinnamic aldehyde. Artificial color and small traces of sugar were used in the cinnamon mixture. Attempts were made to obtain as much porosity as possible in the prepared cereal base to fix the cinnamic aldehyde and thereby protect the product against loss of strength through volatilization.

Flour

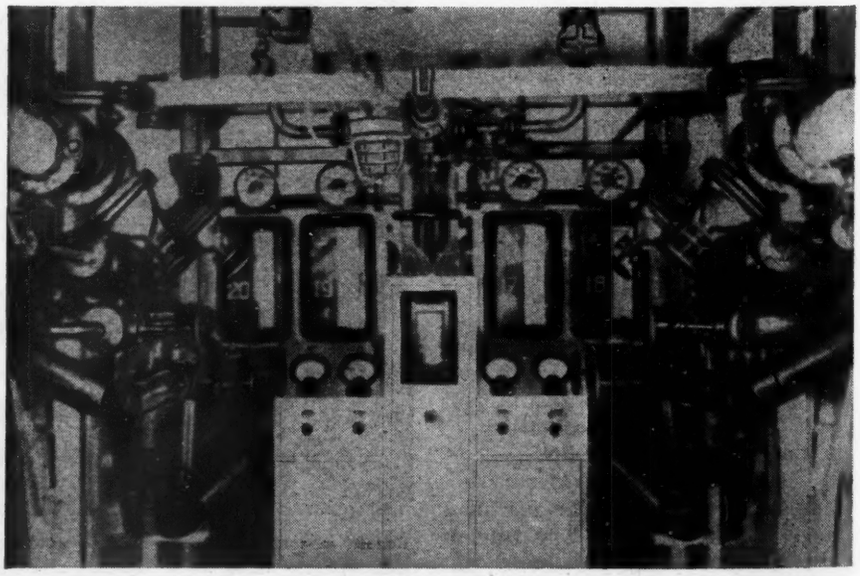
Since the beginning of the war, the milling of flour had been regulated by the German government. By 1942 the milling of patent flours had been prohibited. The standard German flour used for the past 3½ years was called type No. 195. Flour type No. 195 meant that the ash content of the flour was 1.95 percent. In comparison, the ash content is less than 0.5 percent for patent flours. In milling this flour approximately 10 percent of the wheat was removed for use as farina for invalid and infant feeding. The balance of the wheat was then ground into the type No. 195 flour. All of the bran was used in the flour with the exception of the extreme outer coating; known as "bees wings". The low quality of German wheat is well known to cereal chemists throughout the world. Because of its low gluten value, this wheat had been supplemented by 30 to 35 percent Canadian wheat prior to the war. In an attempt to better the baking properties of native wheat, the Germans had devised methods of heat treatment for all grains. Equipment used for heating the grains before milling was very complete and elaborate. In fact, the flour mills of Germany were very well equipped, indeed, that is, all of the flour mills that were left in Germany. It seems that flour mills and grain elevators made very fine targets for our air force and most of them had been pretty well battered to pieces. There were only a few very good mills left but these sufficed to illustrate the high degree of perfection existing in present day German mills. Their mills with highly polished floors and shining machinery were really beautiful —this in spite of the shortage of cleaning materials and insecticides.

Baking Industry

The German baking industry was in a pitiful state. The bakers worked with approximately 80 percent whole rye flour and 20 percent type No. 195 wheat flour. No sugar, fat, milk or other ingredients were available with the exception of salt and yeast. In some cases, even yeast was not available. Cakes and cookies were unknown. There was no such thing as a fried product. The German baker was making pumpernickel and very little else. The clock had been turned back to the Middle Ages with the pumpernickels made from the old fashioned progressive "sours" or "barms" in cases where yeast was not available. The bread was heavy but was quite tasty. This coarse heavy bread served literally as the staff of life in Germany. A very high percentage—possibly 50 percent—of the total calories in the German diet were made up of breadstuffs of this type. Possibly another 30 percent of the German diet consisted of potatoes with the small remainder made up of fat, meat, and vegetables.

Yes, diet and food processing are primitive in present day Germany —primitive because shortages have resulted in an almost complete elimination of the refinements commonly associated with foods in America. Technological advances in the handling and processing of grains, meats, fats and other food material seemed unimportant to a people fighting hard to utilize every available calorie.

In addition to the articles on meat packing and continuous buttermaking, FOOD INDUSTRIES *recently published the following articles on German wartime food technology: Frozen Foods Skyrocketed, February; Preserving Fruit Juices, April; Immersion Freezing in Liquid N_2O, May; All That's Left of the Chocolate Industry, August.*



Process control station of the fatty acids synthetic plant operated in the Ruhr.

Sidelights on Food Processing From McGraw-Hill Man in Berlin

Pictures of German plants appearing with George T. Carlin's article were obtained during the past summer by Tom Falco, McGraw-Hill World News Service representative in Berlin. While inquiring for pictures, he came in contact with a number of German food technologists. His informal report on what he learned is presented here as supplementary information.—The Editors.

THE German spray dried egg product was comparable with the best produced in the U. S. It could be stored for a long time.

One of the largest producers of dehydrated eggs, Kaffee Handels, AG, in Bremen, is an international firm which reputedly exchanged various patents owned by them and those owned by U. S. business.

Kaffee Handels produced and packed a variety of food products. With the exception of one step—the first—their egg dehydrating process was typical of the best in Germany. As a starter, the company received frozen eggs (previously shelled and canned) from the Ukraine and Yugoslavia. This gave a product not so fluffy as that from freshly-opened eggs. These eggs were thawed by immersion in lukewarm water vats for three or four days.

Then the liquid eggs were agitated violently to thin out the liquid preparatory to spray drying. Driers were of a standard type made by Trocknensanlage AG, Berlin. The entire mass was screened through a 20-mesh stainless steel sieve to remove shell particles. These particles are particularly destructive of the synthetic ruby and sapphire spray nozzles, made from large artificial gems supplied by I. G. Farben.

Special Spray Nozzles

The jewel orifices were designed in two pieces. The first piece had a base plate about 5 mm. thick by 12 mm. in diameter; the second, the discharge orifice, had a slight conical concavity on the pressure side. Mixed fluid eggs were given a swirling motion by running the fluid into the concavity through tangential slots in the lower base plate, which made contact with the discharge orifice. The two parts could be aligned and held in place by a stainless steel nozzle-holding head. The entire nozzle consisted of a screw-on clamp, the two stones, and a smooth stainless-steel flange.

Thus, the liquid egg is fed into the area back of the solid base, out around the periphery of the two stones, through the slots which impart the swirling motion to the fluid feed, and out through the tiny orifice and into the warm air chamber. These nozzles were capable of withstanding pressures of 100 atmospheres (about 1,500 lbs. per sq. in.), and wear remarkably well.

After spray drying, the finished egg has 1.5% moisture content. However, it is hygroscopic at such moisture content. The quality-control lab at Kaffee Hag passed all packed egg powder under 6% moisture, but a maximum of 3% to 4% was preferred at time of packaging. Next to odor and taste, moisture content represented the most important quality test in the lab.

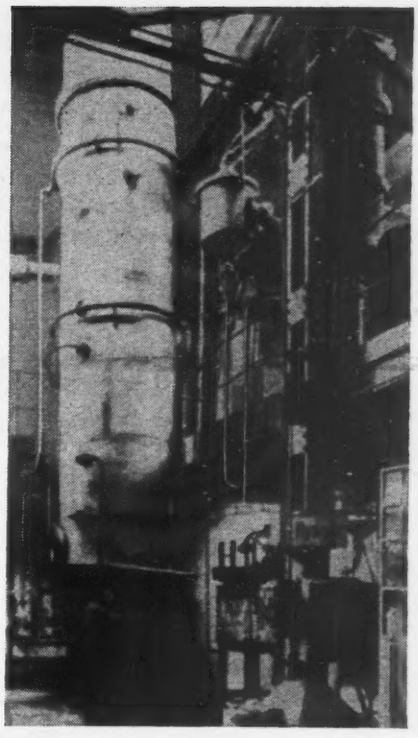
This company produced the dehydrated eggs entirely for the Wehrmacht, as was the case with the six or seven other such plants, in Germany during the war. The biggest was in Stuttgart.

Wartime output must have been substantial because the whole German Army got some of the stuff. Individually, the distribution was small (an average of 15 g. every 10 days), but multiplied by the millions in the service, it was obviously large.

The finished product could be stored for two or three years under "good conditions." My informants say that "good conditions" refers to temperature and humidity.

Synthetic Fats

On synthetic fats, I hit the jackpot. I interviewed Dr. Werner Wachs, Germany's authority on the product. He is working right near us, back of the Kaiser Wilhelm Institute, at the Institut fuer Ernaehrung and Verpflegungswissenschaft (Nutrition Institute). This organization works for Berlin specifically and for Germany generally. They are doing all sorts of fascinating things there. But first, on the synthetic fat. Enclosed are three pictures that show equipment used in their manufacture. I learned that the output of synthetic fat in Germany reached 40,000 metric tons in the years 1942 and 1943.



I. G. Farben oxidation units show scale on which synthetic fat process was operated.

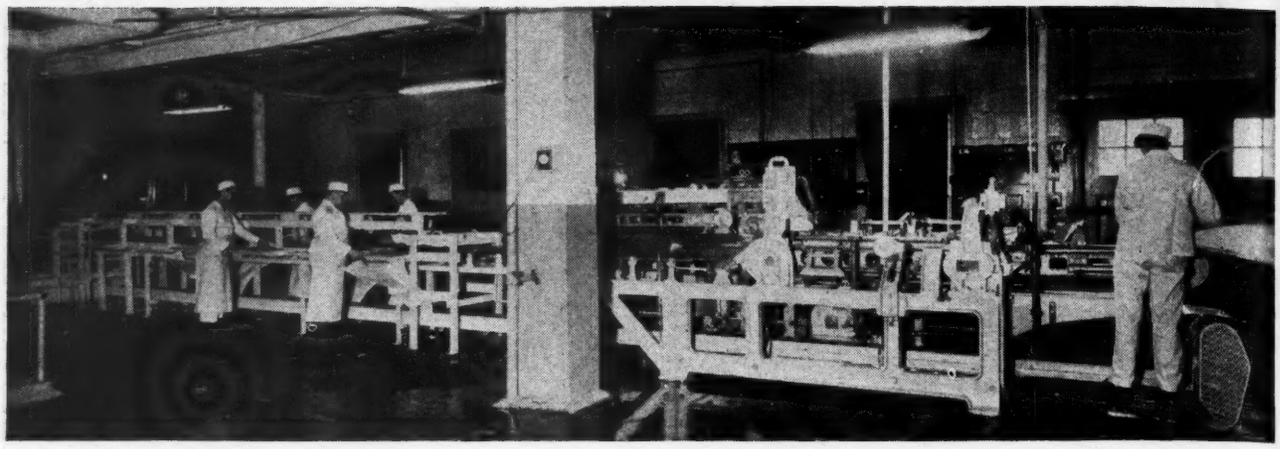
Baking

My interviews, necessarily limited by time, brought out no information on whether the Germans had any special baking equipment not generally used or known in the States. But I have a few tidbits for you here.

At the Nutrition Institute, I got hold of another member of the staff, Dr. Engel. Among his researches are experiments with rye and barley. The idea is to release the starch particles in these products and use them to thicken the slim meals eaten by Berliners. As I understand it, the advantages are two: (1) augmenting carbohydrate supply and (2) giving bulk to the food. Some refinement of the process is needed, but the big bar to its use is adequate machinery.

On baking *per se*, I was told that the Germans mix 18 milligrams of bromide per 100 kilos of flour. This technique is related to the high water content of German bread today (they must make 150 kilos of bread out of 100 kilos of flour). Also, the ash is higher owing to the high extraction rate—some 95 percent.

(*Turn to page* 212)



This is the cod and haddock automatic fillet machine that took Atlantic Coast Fisheries Co. nearly 20 years to develop. About $1,000,000 was invested in it. Here the machine is shown in operation on Boston Fish Pier. Worker at right feeds headed haddock into the machine. Four workers at left trim and inspect fillets. Operation is more sanitary than hand filleting.

Fish Filleting Machine Cuts All Commercial Sizes

Need of high-speed, automatic fillet machines was recognized by the fish industry. It took Atlantic Coast Fisheries Co. nearly 20 years to develop one. The machine reduces cost, improves product, stabilizes production

By JOHN V. ZIEMBA, Assistant Editor, "Food Industries"

A filleting machine has been the hope and dream of all fish producers since fish were first marketed in fillet form. Industrial filleting was begun in 1921, when Dana Ward, operating on the Boston Fish Pier, commercialized a practice known to housewives and hotel chefs. Instead of selling whole fish with inedible portions, such as fins, head and backbone, he offered the two large side muscles as "fillets." Fish, in this new form, met with immediate widespread acceptance. Within a few years the fish business changed from a whole fish business to a fillet fish business. Due to the skilled labor required for hand filleting, need for a high-speed, automatic filleting machine was indicated. A machine had to be designed so that fillets could be cut, devoid of most of the bony structure with as high an edible flesh recovery as possible. Mechanical-minded operators began to think of straight line production machines clicking out perfect fillets with clock-like regularity. Scarcely a substantial fish filleter in New England has not tried to develop his own machine or trial-test some device claimed to be a filleting machine.

History of Development

Demand for a filleting machine was world wide. Unlimited sums of money and hundreds of thousands of man-hours were invested in the development work. There is no estimate of the American and Canadian dollars, British pounds, German marks, Japanese yen and Russian rubles spent on experimental filleting machines. Yet, it was 17 years after the first commercial hand filleting operation that a commercial filleting machine was operated by Atlantic Coast Fisheries Co. at Provincetown, Mass. for whiting.

Successful outcome of the filleting machine project is a perfect example of coordination and unity of purpose. The development is due chiefly to the efforts of three men, W. H. Hunt, California engineer; C. M. Savrda, chief engineer, Atlantic Coast Fisheries and W. A. Ellison, Jr., manager of engineering, Atlantic Coast Fisheries. The basic principles of mechanical filleting were developed by Hunt. Improvements were achieved jointly and separately by Hunt and Savrda. Machine design was evolved by Savrda. Ellison brought coordinating ability, knowledge of the anatomy of fish and experience in plant production methods. None of these men were fishermen. Hunt was originally a mechanical engineer. Savrda was a specialist in automatic machinery. Ellison was a biologist and physical chemist. Hunt began his work in 1927, Savrda in 1934 and Ellison in 1935.

Atlantic Coast Fisheries Co. started work on developing an automatic filleting machine in 1923. Up to 1930, three unsuccessful attempts

had been made. The fourth and final attempt was initiated in 1930, under the administration of H. F. Taylor, president; C. L. Guyman, executive vice president and A. H. Cooke, vice president of the engineering division. Advantages of a high-speed, automatic filleting machine were recognized by these men. Their object was to develop a machine that was to be used only by the company. It was at this juncture that the Hunt filleting machine entered the picture.

The company's original objective was to develop a machine for cod and haddock. Development of a whiting filleting machine in 1938 left the company far from its original goal. Although a nearly perfect cod and haddock machine had been built and operated for some time in New York, it required test operation on a production scale in a commercial plant. The New York administration of the company accordingly moved the machine to Boston, where nearly a year was required to iron out the remaining difficulties. Finally, the cod and haddock machine was perfected in 1943 in the Boston plant under the local management of S. deJ. Osborne, vice president. Altogether, nearly 20 years of time and one million dollars had been invested in the filleting machine project.

Some of the Difficulties

It was not surprising that it took so long and required so much money and effort to produce a filleting machine. Here was an object to be cut that had no consistent uniformity. It was neither square, round, nor rectangular. It varied in all degrees of softness and firmness, even in individual fish. One fish might be round, firm and resilient on one side and at the same time pitted by ice, flat, soft, and flabby on the other side. It was slippery. There was no uniformity of size. Individual fish varied from 14 in. to 32 in. in length with corresponding increase in radial dimensions. Fish showed a 1,000 percent weight variation. Weight range to be cut varied from 1 lb. to 10 lb.

This was the object from which two shapely, uniform and bone-free fillets had to be cut. Hand cutting skill had to be bettered. Sense of touch that enabled the hand cutter to guide his knife unerringly in right areas and to vary pressure with the knife as he struck soft or hard areas, were absent in the early machine. Means had to be devised whereby precise cuts could be made consistently. A method had to be developed so that fish could be held in exact alignment with the cutting units. Devices had to be provided to feed the fish through cutters at uniform speed.

The machine had to stand the gaff of the fish industry. It had to be fool-proof. This machine, as complex as a Swiss watch, had to be built as rugged and as indestructible as a Sherman tank, and yet be operated without graduate engineers or skilled mechanics. It had to be designed so that cutting knives operated like surgical in-

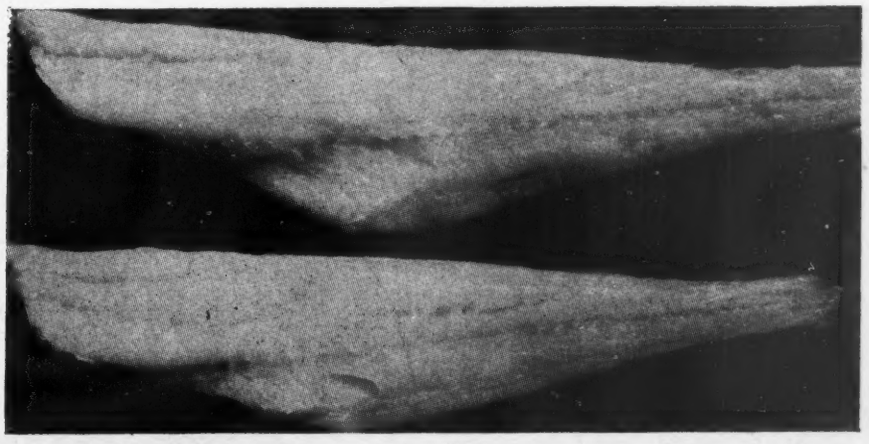
TABLE I. Fillet Production Capacity of Cod and Haddock Machine

Round weight of fish: Individual fish, lb.	Potential 8-hr. day production, lb.	Yield of fillets per 8-hr. day: Machine cutting, 50% recovery, lb.	Machine cutting, 48.5% recovery, lb.	Hand cutting 42% recovery, lb.
1.0	21,600	10,800	10,476	9,072
1.5	32,000	16,000	15,520	13,440
2.0	43,200	21,600	20,952	18,144
2.5	54,400	27,200	26,384	22,848
3.0	64,800	32,400	31,428	27,216
3.5	76,000	38,000	36,860	31,920
4.0	86,400	43,200	41,904	36,288
5.0	108,000	54,000	52,380	45,360
6.0	129,600	64,800	62,856	54,432
8.0	172,800	86,400	83,808	72,576
10.0	216,000	108,000	104,760	90,720

TABLE II. Production Record* of Fillet Machine from May to November, 1944

	Month's production, thousands of pounds: Round	Fillets	Recovery, percent	Operating time, hr.	Production rate, thousands of pound per hr.
Haddock					
May, 1944	529	250	47.3	75.5	3.3
June	362	175	48.4	50.7	3.5
July	227	110	48.6	35.7	3.1
August	152	75	49.2	21.8	3.4
September	222	110	49.6	33.3	3.3
October	145	73	50.3	23.1	3.2
Total	1,637	793	48.9	240.1	3.3
Serod					
May, 1944	88	40	44.9	23.4	1.7
June	159	72	44.9	37.0	1.9
July	207	96	46.1	50.0	1.9
August	160	75	46.7	37.9	2.0
September	219	101	46.3	54.5	1.8
October	24	12	47.1	6.6	1.9
Total	857	396	46.0	209.4	1.9
Cod					
May, 1944	71	34	47.8	9.4	3.6
June	23	11	47.1	3.3	3.3
July	84	38	45.1	10.0	3.8
August	10	5	47.1	1.3	3.7
September	15	6	43.1	2.0	3.2
October	9	4	45.0	1.7	3.6
Total	212	98	45.9	27.7	3.5
Total — All Fish					
May, 1944	688	324	....	108.3	2.9
June	544	258	....	91.0	2.9
July	518	244	....	95.7	2.9
August	322	155	....	61.0	3.0
September	456	217	....	89.8	2.8
October	178	89	....	31.4	2.9
Total	2,706	1,287	....	477.2	2.9

*Prepared by Stevenson, Jordan and Harris, Inc., Management Engineers, New York City.



Haddock fillets cut by the cod and haddock machine. Fillets were cut from fish weighing 6 lb. The machine improves the appearance of the fillets and increases yield.

A close-up showing a typical hand filleting operation conducted 20 years ago. Hand cutting yield is about 42 percent of the total round fish weight. With automatic filleting machines, the yield is increased to 48.5 percent under more sanitary operating conditions.

struments in the hands of a skillful surgeon.

Machines had to be constructed so that they could operate under adverse conditions, such as extreme temperature variations and continual dampness. No oil or grease could be used to lubricate external friction surfaces and protect them from corrosion.

Skill, patience, ingenuity, clever conception, fine analysis and inventive ability were necessary to develop a machine which would overcome these many difficulties. Unusual engineering knowledge was required to synchronize the motions necessary for simultaneous and consecutive interlocking action.

Advantages of the Machine

Compared with hand filleting, the Hunt filleting machine has the following advantages: (1) It greatly increases yields, (2) large labor savings are provided, (3) it reduces the amount of skilled work needed, (4) it improves the appearance of the product, (5) it contributes toward the solution of serious problems due to irregularities in the supply of raw material, (6) it reduces floor space requirements and (7) it provides for better plant sanitation.

Machine Specifications

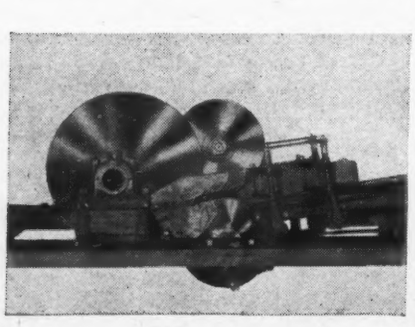
The machine is 21 ft. long, 6 ft. wide, 6 ft. high and weighs 4½ tons. Weight is carried by four pedestals which distribute the floor load. Circular knives and transmission are driven by standard speed motors totally enclosed. There are six motors in all with a total hp. requirement of 7 hp. The machine requires one operator, feeding at the rate of 45 fish per minute.

The fish reach the machine with heads removed. Fish are then fed, back down and tail forward, into a trough-shaped flight conveyor. The trough consists of two parallel rows of angular flights with a stationary groove on the bottom to accommodate the dorsal fin. Fish are carried forward until the tail projects through an opening in a gate. Here fish are stopped momentarily and held until a pair of grippers can hold them by the tail and bring them in exact alignment with the center of the machine and the dorsal and ventral cutting units. As the grippers grasp the tail of the fish, the gate unlocks and permits free passage of the fish through it. At this stage, the tail and dorsal fin are positioned in a slot between the two halves of a centering trough and guided into the first cutting units.

In the first actual cutting operation, a pair of high-speed circular cutters, set on an angle to each other, make a ½ in. incision through the dorsal side of the fish. These cutters have parallel scrolled faces that pull out the dorsal fin, leaving a V-shaped groove in the back of the fish. The fin drops onto a waste conveyor.

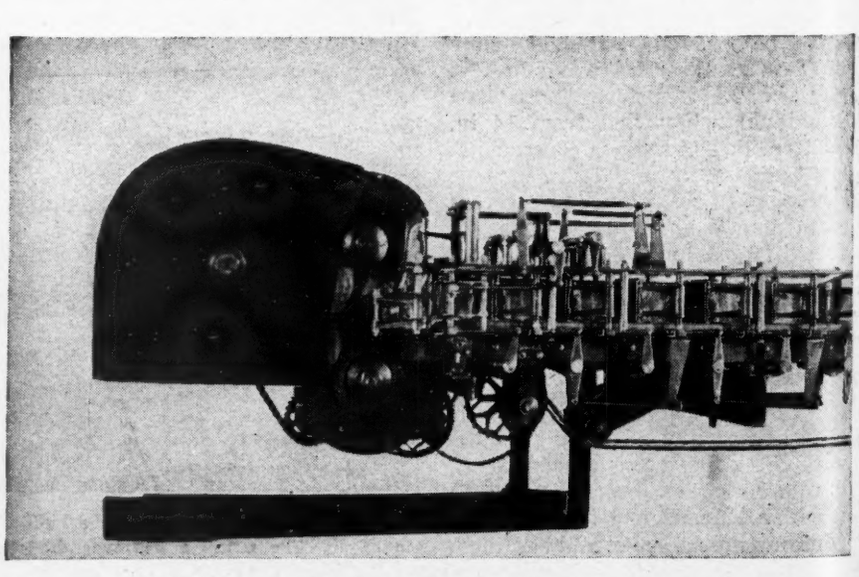
The next cutting operation is made by a pair of stationary plow knives with slightly flared points. As the fish continues forward in the machine, these knives correct any misalignment of the backbone and make parallel cuts along the dorsal side of the fish. At this stage, the fish has been cut from the dorsal side down to the backbone along the entire length of the fish. No cut has been made, as yet, on the belly side.

A combination of cutters, consisting of paired traction discs, tail cutters and belly cutting knives, per-



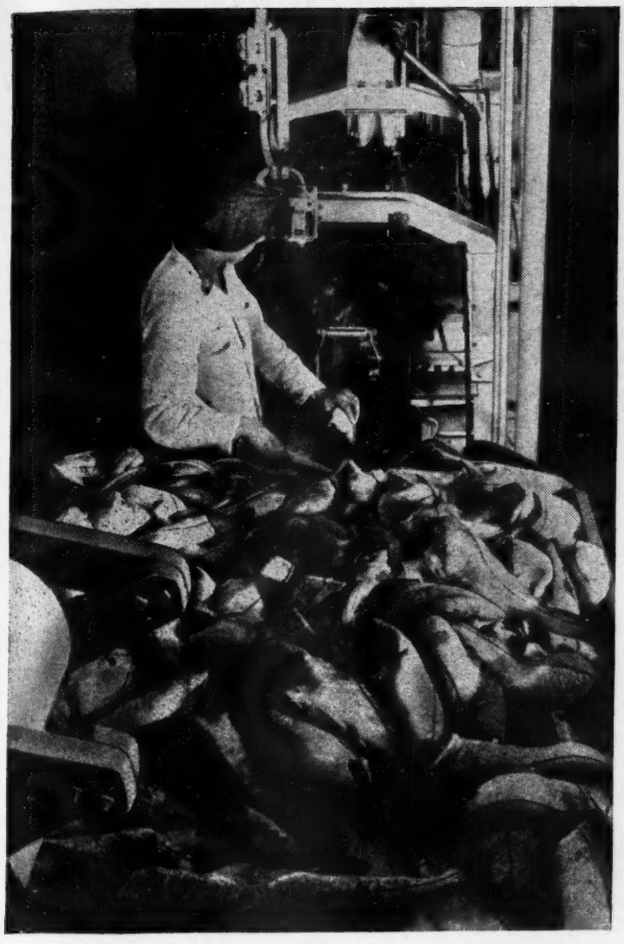
(Above)

Photo shows circular cutting knives on original Hunt automatic fillet machine.

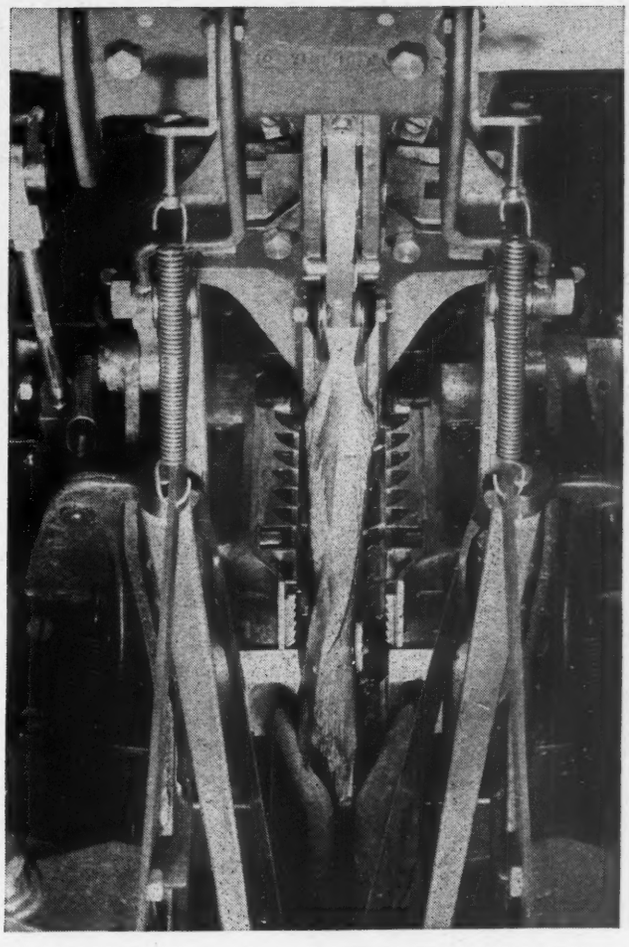


(Right)

An early machine developed by Hunt and acquired by Atlantic Coast Fisheries. Machine lacked many essential features incorporated in the final automatic fillet machine.



Scaled, gutted and headed haddock being fed, dorsal side down and tail forward, in trough-shaped flight conveyor of fillet machine. Operator feeds fish at the rate of 45 per minute.



Fish are stopped momentarily in the machine so that a pair of grippers can hold them and bring them in an exact alignment with the center of the machine and dorsal and ventral cutters.

forms the third cutting operation. The fish is moved forward by a reciprocating unit and the tail is placed between traction discs that pull the fish forward. Simultaneously, belly cutting knives cut on each side of the belly fin to the backbone.

Now fillets adhere to the skeleton by a thin strip of flesh along each side of the backbone and by a band of flesh along the ribs. Two paired, long diverging ribbing knives, which extend from the traction discs to the discharge end of the machine, sever these attachments so that two fillets are produced. The fillets fall on conveyor belts adjacent to and under the ribbing knives, while the skeleton falls between the ribbing knives onto a conveyor.

Saving in Labor

Skilled hand filleters generally fillet about 500 lb. of haddock and 550 lb. of skin-on cod per hour. Average yield in the industry is 42 percent. At this rate, hand filleters can cut 210 lb. of haddock and 231 lb. of cod fillets per hour.

Taking 3½ lb. haddock as an example, the fillet machine produces 4,583 lb. of fillets per hour when operated at a rate of 45 fish per minute with an average 48.5 yield. A crew of nine men work with the machine. They operate as headers, feeders and trimmers. The average man-hour output is 509 lb. The ratio between hand and machine cutting is 210 lb. and 509 lb. of haddock fillets, respectively.

To level out production in hand filleting plants, many species of fish are filleted and some are skinned. Since the machine does not cut odd species nor skin fish, it is unlikely that the labor balance in

TABLE III. Operating Time Records* of Fillet Machine from May to November, 1944

	Possible operating time, hr.	Actual producing time, hr.	Production time lost, hr.	Activity, percent	Cause for lost production time: Lack of fish, hr.	Hand cutting, hr.	Delay in starting, hr.	Wait on wrappers, hr.	Wait on fish, hr.	Machine trouble, hr.	Miscellaneous delays, hr.
May, 1944.....	193	108	85	55.8	46.4	6.8	2.9	14.3	7.4	5.5	2.2
June.....	199	91	108	50.2	80.0	5.8	2.0	10.0	4.0	3.7	2.7
July.....	185	96	89	51.6	65.6	6.6	2.6	6.2	4.5	1.5	2.2
August.....	206	61	145	29.6	138.3	0.5	0.2	0.5	0.7	3.1	2.1
September.....	175	90	85	51.2	74.4	1.9	1.7	....	3.9	....	3.2
October.....	179	31	148	17.5	136.4	7.5	0.3	....	2.9	....	0.4
Total.....	1,137	477	660	41.9	541.1	30.1	9.7	31.0	23.4	13.8	12.8
Percent lost time to possible hours.....			58.1	....	47.5	2.5	0.8	2.7	2.1	1.2	1.1

* Prepared by Stevenson, Jordan and Harris, Inc., Management Engineers, New York City.

plants will be disturbed. Plants using the machine are expected to benefit in the following manner:

(1) With the same personnel, the same amount of fish will be handled as before. Fillet output, on the other hand, will increase 15 to 18 percent.

(2) By leveling off operations, a probable increase in the handling of fish will take place.

(3) During peak days, when fish are plentiful, the total amount of fish handled may be increased far in excess of that handled in hand cutting operations.

Material Savings

Some machines save labor at the expense of materials handled. This machine, however, is unique. While it is labor-saving, its greatest contribution is in material savings. Those who initiated this project insisted that the machine must better the yield by hand cutting.

Haddock at present prices costs $0.10 per lb. A pound of haddock fillets cut by hand, at a 42 percent yield, costs $0.238. A pound of haddock fillets cut by machine, at a 48.5 percent yield, costs $0.206. Savings obtained amount to over $0.03 per lb. of fillets.

If the machine were operated 40 hours a week to cut standard size haddock averaging 3.5 lb., it could process 19,656,000 lb. of round fish. Fish plants operate only 75 percent of the time because of holidays, irregularities of landings, and labor troubles. Therefore, in the average U. S. plant a machine is expected to cut about 14,692,000 lbs. of round fish. At a 48.5 percent machine recovery, the yield in fillets is 7,119,620 lb. From this same weight of round fish at a hand recovery of 42 percent, the yield in fillets is 6,170,640 lb. The difference in fillet yield of 948,980 lb., converted back into round fish, amounts to 2,233,000 lb. which is one-half the annual landings of all fish by the average large trawlers.

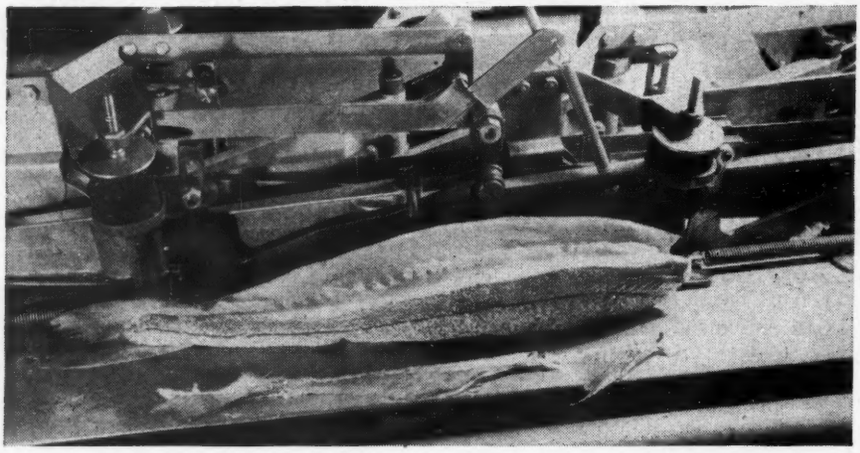
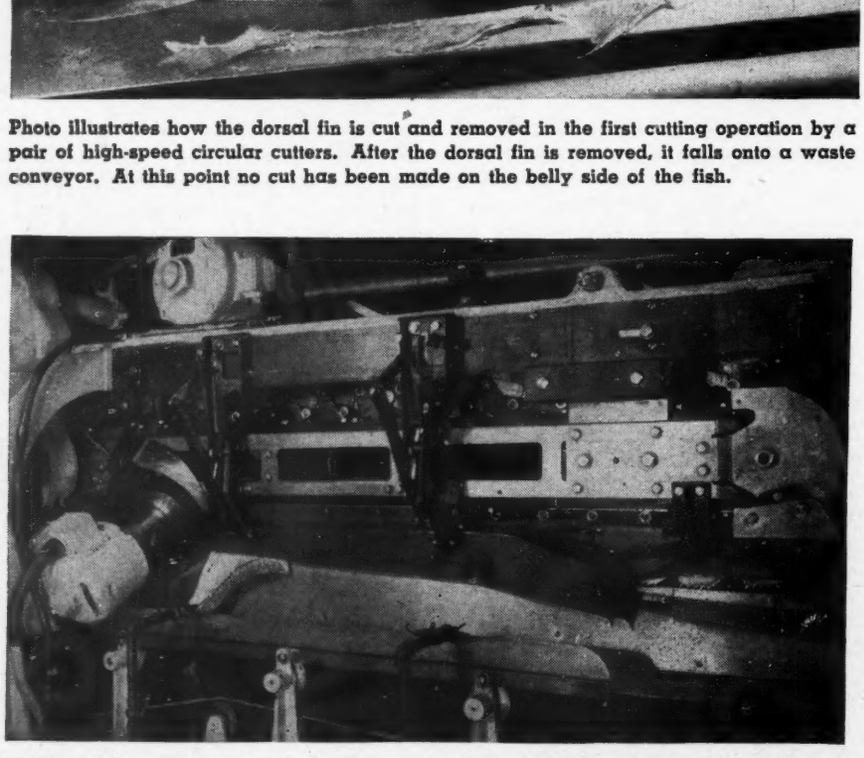


Photo illustrates how the dorsal fin is cut and removed in the first cutting operation by a pair of high-speed circular cutters. After the dorsal fin is removed, it falls onto a waste conveyor. At this point no cut has been made on the belly side of the fish.



Ribbing knife severs strip of flesh along each side of backbone and band of flesh along ribs. Circular knife makes a final cut, allowing fillet to fall on conveyor which carries it to trimmers. Normal operating speed of the machine is 45 fish per minute.

Measures Plant's Efficiency

The pace setting value of the filleting machine is of considerable importance. For the first time in the history of the fish industry, a mechanical unit of almost mathematical precision has been introduced. It is used at the Atlantic Coast Fisheries Co. plant to measure the efficiency of the plant's operations. The average yield of the machine has been definitely established. If yields fall below the average established, there is indication of either slack weights or inefficient operations elsewhere in the plant.

The fillet machine is under the control of one man who regulates the performance of the entire plant. If fish are not supplied to the machine in sufficient quantity to keep it operating, it is an indication of poor performance on the part of weighers, scalers and headers. If, on the other hand, fillets accumulate after being cut, it is an indication of inefficient packaging.

In manual operations, the pace is increased or decreased, depending on the human element. Consequently, man-hour output fluctuates considerably.

Flexibility of Labor

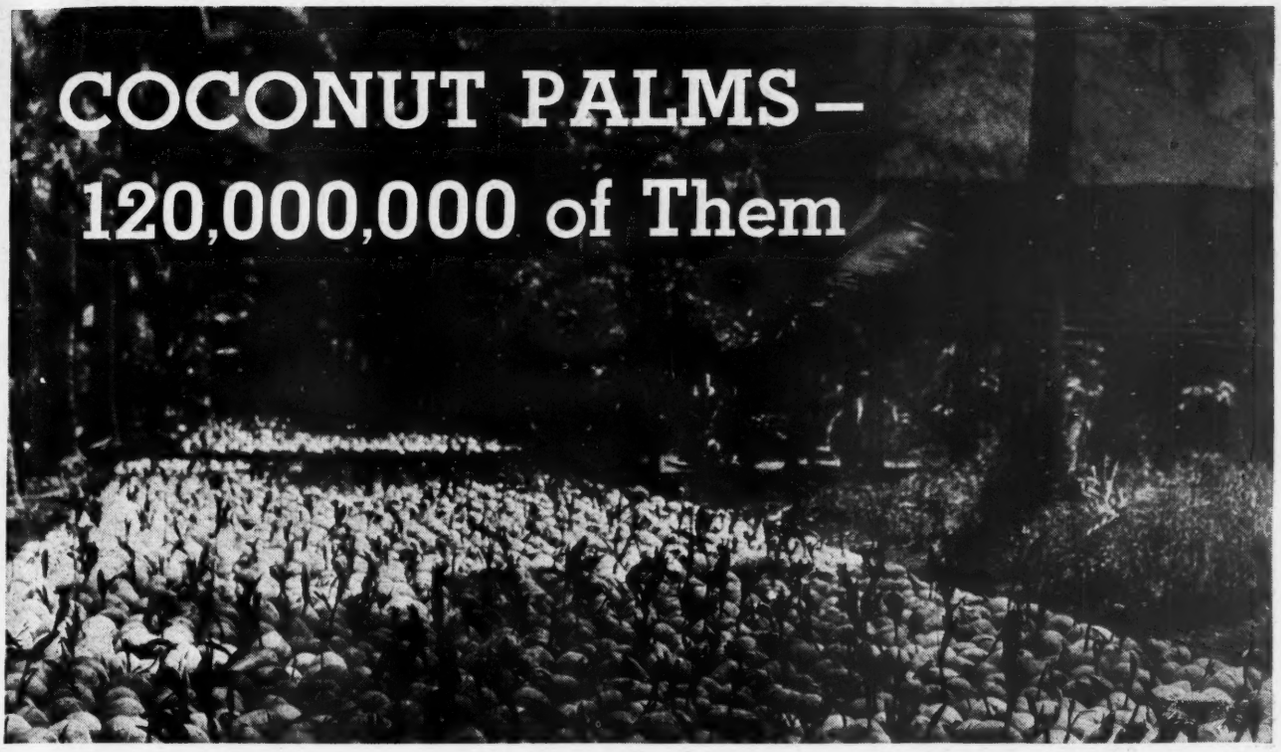
Hand filleting requires weeks of training before the necessary skill is attained. Hand filleting can be costly if the maximum amount of fish flesh is not cut. All operations pertaining to the filleting machine can be taught within a few hours to unskilled help. Actually, the only skilled help required is for upkeep and maintenance of the machine. It has, nevertheless, been the practice of Atlantic Coast Fisheries Co. to pay a filleters wage to those employed in filleting fish by machine.

Maintenance Requirements

Maintenance requirements are slight. Only knife sharpening and correction of guide misalignments are required. It takes a mechanic about ½ an hour per day to service the machine. Since the cod and haddock machine was first installed, it has operated with less than a two percent "down time."

(*Turn to page* 218)

COCONUT PALMS—120,000,000 of Them



The job of converting the meat into copra, to supply both edible and inedible oils, offers another economic and industrial problem for the harried Filipinos. But they appear to be getting this one worked out with some help from the U. S.

By HERBERT LEOPOLD
McGraw-Hill World News Far Eastern Representative

OF all Philippine export crops, coconuts have suffered least from Japanese depredations. The Japs devastated the islands' sugar plantations, wrecked and looted mills and refineries, blew up power plants, flooded mines and destroyed nearly every oil mill in the Commonwealth, but they could not cut down 120,000,000 coconut palms. If the groves suffered any damage at all, it was through neglect of underbrush clearing and insect pest control. But the 120,000,000 trees still stand, spread over 29 of the islands' 50 provinces; and 6,000,000 people, one-third of the total population, who normally depend on them for their livelihood are waiting to get them back into gainful production.

Restoration Easy

This is not a great problem, as far as the speedy rehabilitation of copra exports is concerned. Coconuts, like sugar cane, quickly decompose after harvesting. But unlike sugar, they can be simply and inexpensively converted into a more durable product—copra. Copra is produced by first cracking the shell of the nut in two, an operation invariably performed by hand with the help of a mallet-knife combination known as *perin*. Three methods of curing the exposed meat in the shell are in use: Sun-drying, smoke-curing and commercial dryers. Commercial dryers, though yielding the best kind of copra, have never been widely in use. These are operated either by hot air or, rarely, by steam. Most of the Philippine copra is produced by an open kiln smoking process (locally called *tapahan*) even though sun-drying gives a better product that is free from ashes and creosote. The meat is considered ideally cured when its moisture content has dropped to 5 percent. Owing to careless curing, the moisture content of Philippine copra is usually much higher, with a correspondingly lower yield of oil and greater susceptibility to decomposition.

The Philippine coconut nursery, shown at the top of the page, illustrates how the nuts are placed close together upon the ground. Some of them are sprouting. They will be set out later in a coconut plantation.
Photo by Wide World

Two Export Grades

When the curing process is completed, the *perin* gets busy again carving out slices of dried meat, the copra of the market.

In foreign markets, the copra is classified into two grades: Merchantable Manila and Cebu Sundried. Cebu Sundried, not being contaminated with creosote, is most suitable for the production of edible oils. In local trading, as many as seven grades are known, the standard grade being Resecada. The lowest grade, called Corriente,

has a moisture content of 14.5 to 20 percent or more and is quoted at a discount of 20 percent from the standard grade. Resecada contains from 5 to 6 percent moisture, and the finest grade, Resecada de Bodega, not more than 5 percent. It is sold at a premium of 2 percent on the standard. Copra is shipped in jute or burlap sacks of about 123 lb. net weight.

The total output in the Philippines is approximately 828,000 tons annually, though production declined drastically during the war for lack of markets. Of the total it is estimated that around 392,665 metric tons were milled to produce approximately 235,599 metric tons of coconut oil.

Today, that basic capacity of 800-odd thousand tons can be quickly restored by comparatively simple means. Hundreds of millions of nuts are being allowed to rot by the wayside because planters are without means of transportation to ship the cured meat to the marketing centers. The lack of sacking is another marketing bottleneck. Government loans to planters for the purchase of carabaos, speedy disposal of Army surplus vehicles and supply of burlap bags would go a long way towards reviving copra kilns and getting the cured product to the market. The U. S. War and Navy Department have already aided materially in the movement of Philippine copra by releasing 200 LCN and J boats.

U. S. Has Corner

All purchasing and exporting operations since May, 1945, have been handled by the Copra Export Management Company (CEMCO), a subsidiary of U. S. Commercial Company. Warren G. Libbey, head of the Washington corporation, is confident that exports of copra moving from the Philippines to Pacific Coast ports may exceed prewar volume in the second half of 1946. Copra exports to the U. S. in 1939 amounted to 225,000 tons and reached 244,000 tons in 1940. Total prewar imports averaged about 30,000 tons per month.

In view of CEMCO's admitted difficulties in a year of operations, in spite of its wide powers as a U. S. government corporation, and the adverse criticism that its policy and future export estimates have attracted in native commercial circles, Mr. Benjamin Salvosa, assistant to the manager, National Coconut Corporation (NACOCO), was asked to state the case of the planters and processing industries, which the Commonwealth-owned NACOCO represents.

Says Mr. Salvosa:

"The situation is befuddling at first glance. Exportation of copra, main product of this basic Philippine industry, is controlled by the United States Commercial Company. The USCC, through buying centers scattered throughout the Archipelago, buys copra at $5.25 per 100 kilograms, f.o.b. *bodega* (warehouse) to resell it at the $6 ceiling price in the U. S. Despite the fact that the cost of producing this quantity of copra ranges all the way from $7.50 to $15, depending upon the locality, the USCC is confident it will get enough to ship at least 300,000 tons to American copra crushers this year.

Swap For Copra

"The key to this riddle is to be found in the scarcity of food and clothing in the Philippines today. Under present arrangements, the USCC buys in lots of 100 tons or more. Sellers who satisfy this requirement are extended an all-important privilege; they are paid 40 percent in cash and 60 percent in goods (textiles, canned foods, rice, medicines). Because the majority of Philippine copra producers are small, with landholdings ranging from two to four hectares, they have to pool their production in order to qualify for this privilege. There has not been much success in this direction, however, and they are compelled to sell their copra to Chinese dealers, who even before the war controlled the marketing end of the business.

"Chinese dealers buy copra at an average of $8.50 per 100 kilograms —an apparent loss of $3.25. Actually, this quotation nets them a lucrative profit. Textiles, canned foods and medicines fetch fantastic prices in the black market.

"Unless the present buying system is overhauled, Philippine copra producers will remain at the mercy of Chinese dealers. They have to accept this buying system, no matter how onerous it may be, because jobs are pitifully scarce and the cost of living is high. In coconut provinces, copra production constitutes the only means of livelihood. Small producers harvest the nuts themselves and smoke them into copra in order to save on labor cost. Producers consider this situation far from normal, and they are wondering when normalcy will come.

"Normally, the Philippine coconut crop has a copra equivalent of 759,650 tons, 327,168 of which go abroad in the form of copra, 175,723 in the form of oil, and 100,714 in the form of desiccated coconut shreds. In 1939, some 381 individuals and firms were engaged in the coconut oil industry; 39 manufactured desiccated coconut; 154 undertook the making of soap out of coconut oil; 1,190 dealt in or shipped copra to overseas buyers.

"Copra, inedible and edible oil, vegetable lard and butter were the chief products before the war, and the United States, Japan, Soviet Russia, China, British India, Hongkong, Malaya and some Latin American countries the principal markets.

"As a result of the imposition of the 3-cent excise tax per pound on coconut oil in the U. S. the life of the Philippine copra producer in prewar years was precarious enough. The disruption of copra procurement channels as a consequence of the war, the destruction of coconut oil factories and copra driers or drying plants, the disintegration of credit facilities, the difficulties of transportation and the food shortage have considerably worsened the producer's lot.

Higher Tariff

"Probably, it will worsen still more. Two factors dictate the necessity of readjusting the industry: First, the Bell Bill, which slaps a graduated tariff scale on a quota of 200,000 long tons of copra from July, 1946, when independence was granted the Philippines, to July, 1974, when it will begin to pay full duty; second, the revival of the coconut oil excise tax without benefit of refund. Since 1939, excise tax collections on coconut oil are refunded to the Philippine government, but may not be spent directly or indirectly to subsidize coconut planters or producers.

"As Philippine copra cannot compete with Ceylon copra because of its inferior quality, there are plans to export oil instead of copra. The quality of oil is much easier to determine and transportation costs are lower because less shipping space is required."

Reverse Situation

The coconut oil situation today is the reverse of what it was after World War I when the Philippines had a huge oil milling capacity and not enough nuts from domestic groves to keep the mills in operation. In 1918, copra for milling had

to be imported from Singapore. While in 1912 exports of oil amounted to less than a ton, more than 115,000 tons were shipped in 1918. In the same period, exports of copra fell from 143,000 tons to 55,000 tons.

Even if CEMCO's copra export estimates of 300,000 tons for 1946 should materialize, five in eight nuts would be left rotting by the wayside unless means are found to restore oil mills and desiccating plants as outlets for surplus nut and copra production.

The situation today is that ten of eleven coconut oil mills were completely destroyed, and nine out of ten desiccating and coconut shredding plants suffered a similar fate. What survived the holocaust is hardly sufficient to take care of local consumption.

Obstacles To Rehabilitation

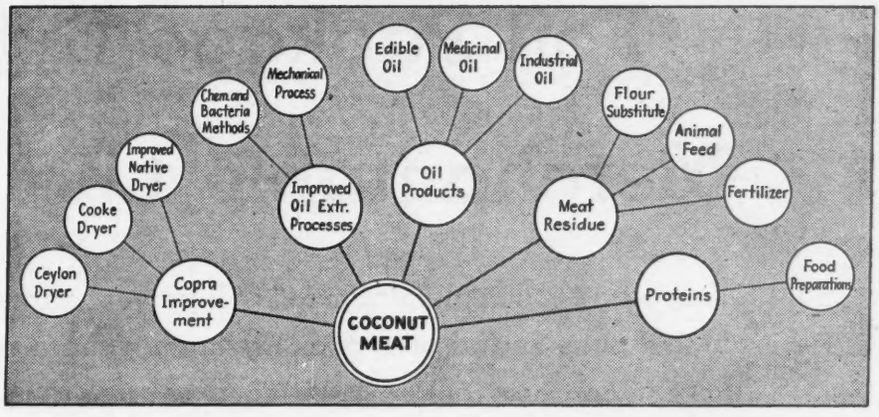
The rebuilding of the oil mills presents both technical and economic problems that cannot be solved quickly. The principal technical problem is the slow delivery schedule of American equipment makers. In one instance a set of expellers was ordered on 16-month delivery terms. If all processing firms had been able to make up their minds immediately after repossession of the damaged properties, the time lag through delivery bottlenecks might have been overcome within this year, with full prewar capacity operations possible next year.

However, uncertainty about the coconut oil export outlook after independence, delays in war damage settlements and abnormally high postwar production and labor costs have combined to put the brakes on rehabilitation.

In addition to the 3c-per-lb. excise tax, edible coconut oil will ultimately have to pay the 4c-per-lb. import duty, making a total impost of 7 cents per pound. Temporary relief was gained under the recent Copra Purchase Agreement, signed in August, by which the Philippine government has agreed to sell its entire exportable surplus of copra and copra oil to the Commodity Credit Corp. for one year beginning July 1, 1946. The price for copra will be $103.50 per long ton f.o.b. ocean carrier and for coconut oil, 7⅛ cents per pound f.o.b. Philippine ports.

Sources close to the American High Commissioner's office in Manila expressed the view that the coconut oil industry would find a firm basis for rehabilitation because no U.S. processing tax is to be collected on denatured oil. In effect, the Philippines would thus be assured of practically the entire U.S. market in other than food industries. Normally, 85 per cent of the coconut oil in the U.S. was utilized by the soap and other non-food industries. They admitted that the benefits would be only temporary and that the coconut industry would ultimately have to adjust itself from bilateral free trade to normal competitive trade in the world markets.

The fact remains however that a considerable refining and hardening capacity was in operation, before the war, which by far exceeded the requirements of the domestic market and depended at least in part on American patronage. Such other markets as existed for edible products, notably China and Hongkong, are not in a condition today to brighten the export outlook.



Products derived from coconut meat affect a great many branches of the food industry. This diagram excludes equally numerous non-food derivatives of the husk and shell.

The Lava Process

With living costs now four times above 1941 and crop shares and agricultural wages correspondingly higher, Philippine copra and coconut oil find it hard to fit themselves into the controlled price pattern of the United States and other markets. Both prices and production costs are gradually coming down, but most observers predict that the curve will flatten out at 100 percent above 1941. This would be far too high for continued enjoyment of the American market, even for denatured crude oil, after imposition of the graduated tariff in accordance with the Bell Act.

The need for agricultural and technological improvements as a means of offsetting high labor cost became first apparent after inauguration of the Philippine Commonwealth in 1935 with its forebodings of eventual complete independence and the concomitant loss of tariff immunity in the United States.

The National Coconut Corporation was organized by the government in 1940 with a view to mobilizing the available scientific and engineering talent in the islands in a search of methods of growing best-quality, high-yield coconuts and increasing the nut yield of trees; of better and more economical methods of producing purer coconut oil; and ways of utilizing the products of coconut other than the meat, such as husks, shells, etc.

NACOCO is now picking up where it left off in 1941 after a year of fruitful research, and among the many projects on its postwar rehabilitation agenda is the testing of the first Lava unit for the direct extraction of oil from fresh meat.

The present commercial method is the expeller process of extracting the oil from copra. The disadvantages of this process are manifold. The fresh meat must first be cured at considerable expense, and at the risk of contamination, and must be transported over long distances to mills to produce coconut oil, with the residual cake and meal of small market value. The oil always contains a high amount of free fatty acids and is rancid and colored. It must be refined if processed into edible products, and the cake and meal is suitable only for animal feed.

To overcome these disadvantages, the best way would be to evolve methods which produce oil directly from fresh coconut meat in small units scattered over nut-growing districts, making it possible to ship low-freight oil instead of high-

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Foil Package Extends Merchantable Life of Peas

Wrapping peas in aluminum foil will prevent shrinkage. Foil-wrapped shelled peas and peas in pods have more sugar and less starch than those in cardboard or baskets. They are more tender and less mature

By CLARK A. SUMNER, Food Chemist
Reynolds Research, Reynolds Metals Co., Glen Cove, New York

ABOUT 20 to 30 percent of all vegetables that farmers produce are wasted before reaching the consumer. Prepackaging at the point of harvest, precooling and subsequent refrigerated shipment and storage can reduce this waste by 25 percent or better.[1]

Competition between canned, frozen and fresh produce industries is becoming very keen. Fresh produce represents about 85 percent of the total U. S. consumption, while quick frozen produce represents only one percent. Looking at these figures from another angle, production of frozen foods will probably increase 400 percent in the next year or two. Canned food production has increased 63 percent during the war years, while sales of fresh produce have increased only 23 percent.[2]

Canners and freezers are striving, through quality control, to improve their products to a point where they approach, as nearly as possible, the fresh state. To compete with canners and freezers, shippers of fresh produce must also cultivate consumer preference through high quality merchandise. This can be attained by prepackaging and proper shipment and adequate refrigeration.

Air lines, while important contributors to prepackaging research, will continue to fly mainly luxury items. Railroads, on the other hand, will handle the bulk of produce shipped to markets until air line rates are reduced.

For most efficient handling, field-fresh, ready-trimmed produce in suitable containers will be shipped in suitable railroad cars maintained at 40 deg. F. in transit. Several railroads are working on the ideal car. Use of top icing, under which aluminum foil containers stand up favorably, has now become a proven practice. Equipment is available for blowing snow ice into cars.

One factor of importance to both shipper and retailer is the weight loss or shrinkage of produce during shipment and storage. At 70 deg. F. and 50 percent relative humidity, shelled peas have been held five days days in an aluminum foil container without weight losses. Peas packaged in cardboard containers, however, show a 20-percent weight loss.

Aluminum foil, as a wrapper for peas helps to maintain quality and grade in storage and shipment. Note the fresh-picked appearance of the shelled peas.

Prepackaging Peas

In a series of tests, shelled peas and peas in the pod were packed in the Imperial Valley section of California and shipped by plane to New York City without precooling. They were put up in the following manner:

1. Shelled peas were packed in 2¼ in. x 4 in. cardboard cartons lined with an improvised, unsealed aluminum foil bag. Four of these cartons were placed in a larger chipboard carton containing an 0.00035 in. aluminum foil liner bonded with asphalt to 30 lb. kraft with the foil side out. The larger carton was then overwrapped with the same material, foil side in.
2. Shelled peas were packed similarly to (1) except that an aluminum foil liner and overwrap were not used.
3. Peas in the pod were packed in standard bushel baskets, lined with foil-kraft liner and an 0.0008 in. inner liner.
4. Peas in the pod were packed

in standard bushel baskets without liners.

Air cargo shipment took two days. Average temperature in flight was 60 deg. F. All four lots of packaged peas were analyzed for quality and grade upon receipt of shipment and after additional three days' storage at 40 deg. F. and 70 deg. F. At each interval canner's analytical methods were employed to determine grade and quality. Results of these tests are given in the following:

Alcohol-Insoluble Solids

Alcohol-insoluble solids content of peas is a good measure of their starch, hemicellulose and cellulose contents. The higher the A.I.S., the tougher and more starchy are the peas. Shelled peas packed in aluminum foil had an A.I.S. content of 1.19 when shipped by air. The same lot of peas in a cardboard container had an A.I.S. content of 1.49. Shelled peas in aluminum containers had an A.I.S. content of 1.09 when shipped by plane and stored three days at 40 deg. F. The same lot of peas in cardboard containers had an A.I.S. content of 1.71, an increase of 36 percent, over those in aluminum foil.

Alcohol-insoluble solids contents of peas in the pod were 1.20 and 1.45 when packed in aluminum foil and cardboard respectively, and shipped by air express. There was no change in A.I.S. content of peas in pod after shipment and three days' storage at 40 deg. F. The same lot of peas packed in cardboard containers on the other hand, showed a 23 percent increase in the A.I.S. content.

Sugar Content

Shipment and storage adversely affect the sugar content of peas. High quality peas should have a high sugar content, if they are to bring premium prices. Shelled peas in cardboard containers had 48 percent less sugar than the same lot of peas in aluminum foil containers when shipped by air express. In shipping peas in pods by the same method, those packed in cardboard had 15 percent less sugar than those in aluminum foil.

Brine Flotation Tests

Another index to the maturity of peas is the brine flotation test. The greater the number of peas sinking in a 14 percent brine solution, the more mature are the peas and the poorer the quality. After shipment by air, 40 percent of the shelled peas in aluminum foil sank. Seventy-five percent of the same lot of peas in cardboard sank. In the same shipment of peas in the pod, 50 percent of the lot packed in aluminum foil-lined baskets sank, while 70 percent of the lot without liners sank. These results indicate that peas in cardboard containers or bushel baskets lined with aluminum foil remained higher in quality and did not mature as fast as those without foil liners.

Another method extensively used to determine quality of peas is the tenderometer. Here, toughness or tenderness is measured directly. The higher the reading, the less tender and more tough are the peas. After shipment by air and 3 days' storage at 40 deg. F., shelled peas in aluminum foil containers had a tenderometer reading of 105. The same lot of peas in cardboard containers showed a tenderometer reading of 147. Peas in pods in aluminum foil containers had a reading of 105 after the shipment. Those in cardboard had a reading

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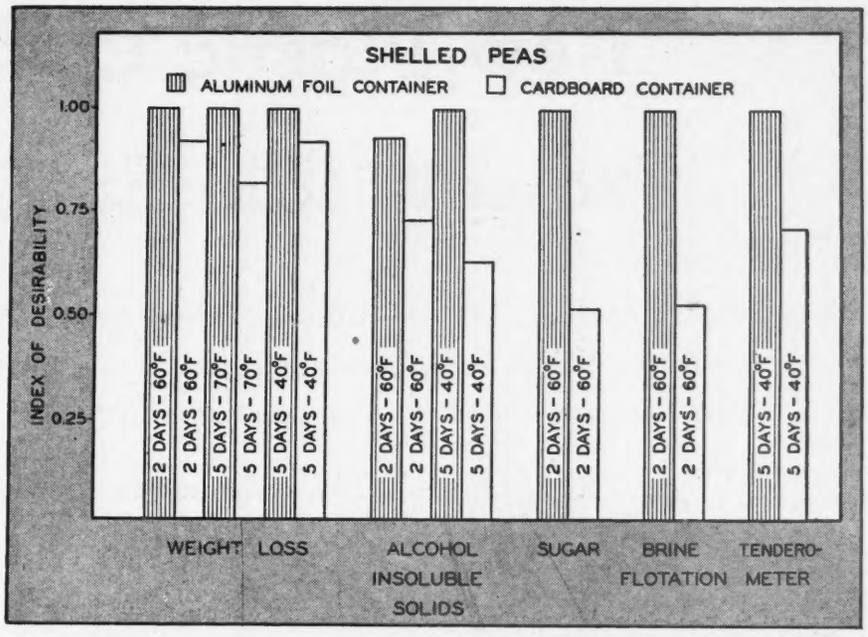


Fig. 1. Shelled peas, in a foil-lined carton, show less shrinkage, retain more sugar, develop less starch, are tenderer and less mature than those packed in cardboard.

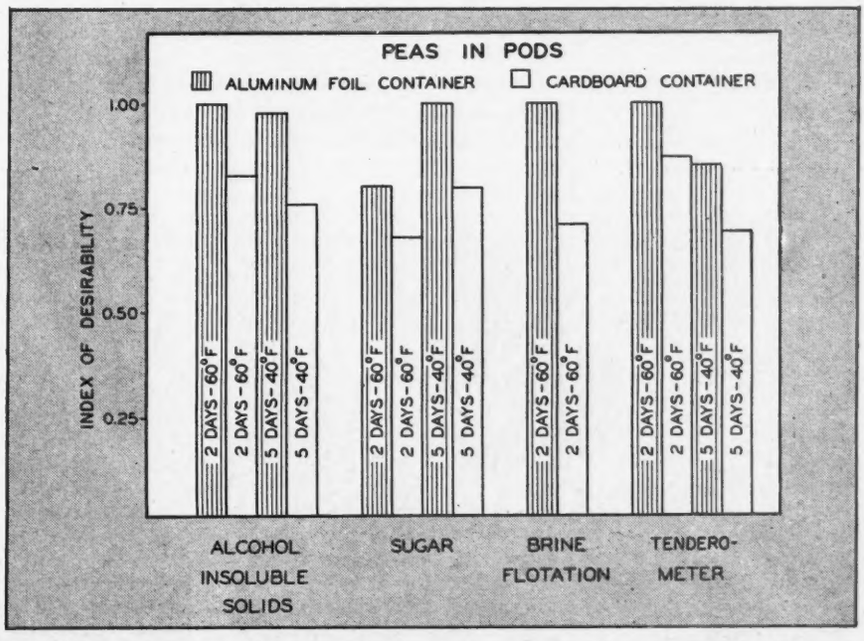


Fig. 2. Peas in pods retain more sugar, develop less starch, are more tender and less mature when packed in foil than when packed in bushel baskets.

New Plastic Covering Protects Idle Equipment

Strip-off coating, used by Army and Navy to protect guns and machinery, is now available for factory equipment going in storage. Inexperienced operators can spray on the coating, which acts as a moisture barrier

By ARTHUR V. GEMMILL, Assistant Editor, "Food Industries"

A METHOD for preserving and storing industrial equipment by an improved plastic packaging process which should find many applications in the food processing field, has been developed by the R. M. Hollingshead Corp. of Camden, N. J. It is generally carried out by spraying, although for some types of work a more practical means of application is by dipping.

Based on the Navy's "Operation Mothball" technic, the new process, called the "Cocoon" system, involves the application of several layers of a plastic sprayed on a tape webbing and encasing the equipment. The plastic consists of a modified film-forming vinyl resin, carried in volatile solvents.

The cocoon system is a simple and quick means of packaging parts, assemblies, or complete machines, regardless of size or shape.

When preparing a piece of equipment for storage, treatment with heavy grease or rust prevention compound is not necessary. The regular operating lubricants are kept in the machine. Because of this, no extra cleaning or preparation is required when putting the machine back into service.

To eliminate the possibility of a sharp corner piercing the finished cocoon, all projections on the ma-

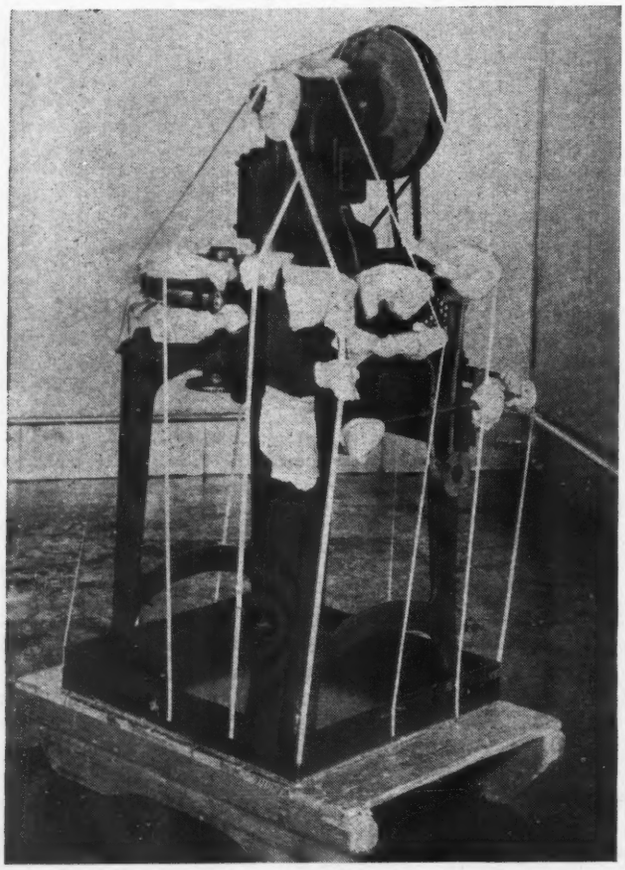


FIG. 1 When preparing a machine to be packaged, sharp projections are padded and vertical tapes are applied.

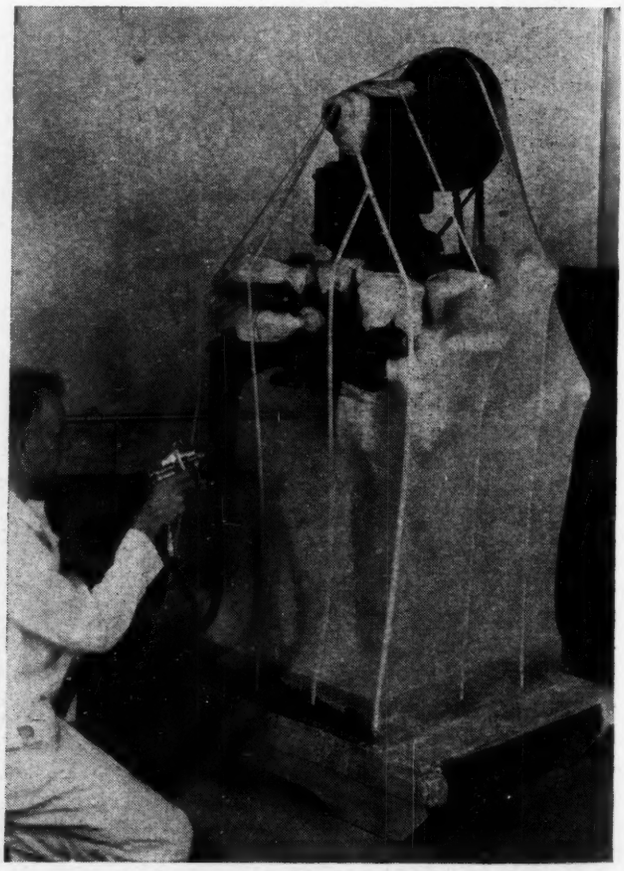


FIG. 2. Cobweb-like threads bridge the gaps between tapes but do not penetrate to the parts of the machine.

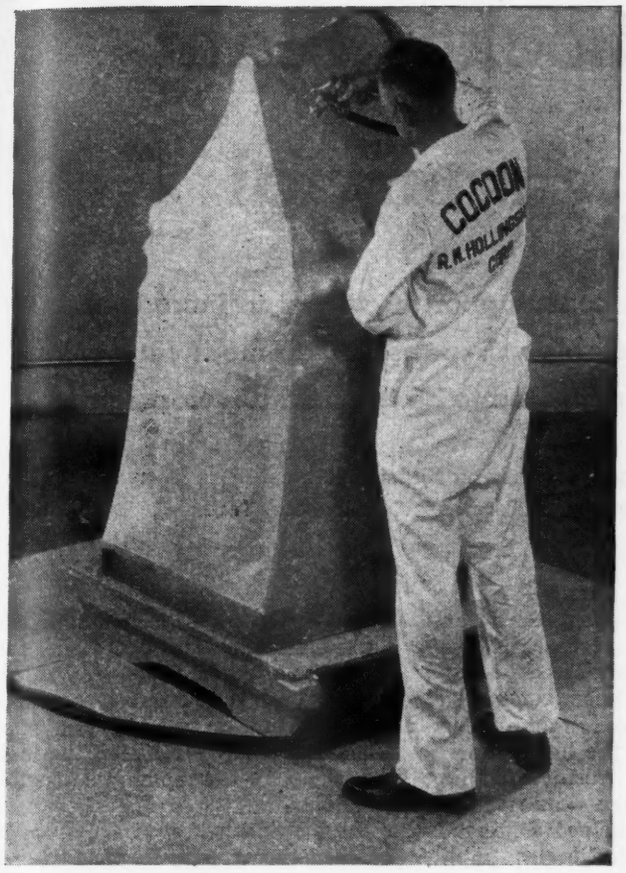


FIG. 3. Subsequent applications enclose the entire machine in a plastic jacket approximately 0.020 in. thick.

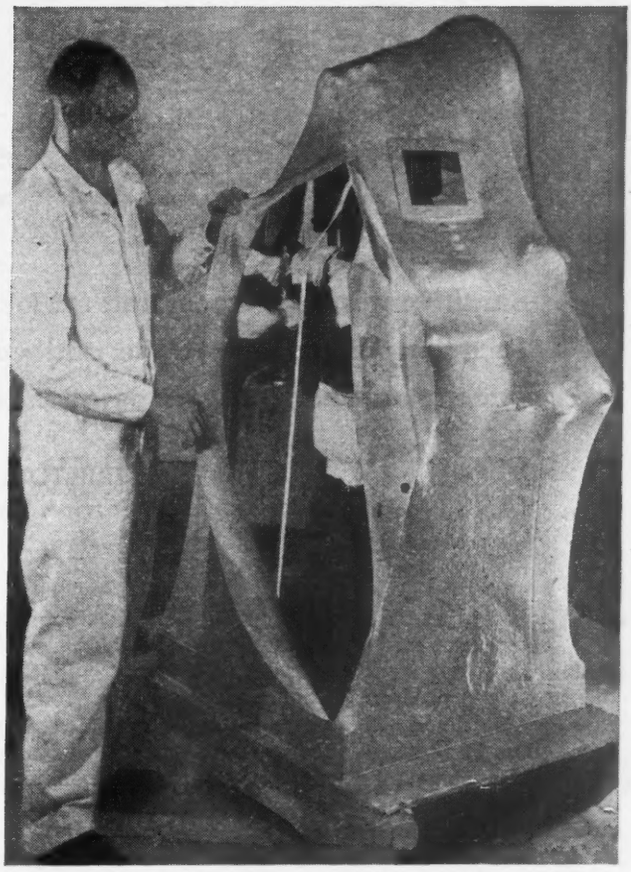


FIG. 4. "Cocoon" being stripped from the machine. Note that it does not adhere to metal surfaces, pads or tapes.

chine to be packaged are padded by taping on wads of rag, or other suitable material. Ordinary pressure-sensitive tape, such as Scotch tape, is then applied in strips connecting the outer projections of the machine (Fig. 1). When large pieces of machinery are to be wrapped, tape is applied, first vertically, then horizontally, resulting in a tape grid with squares of approximately 20 in. dimensions. The object of the taping is to give the package a more even contour, and to reduce the amount of material required.

Applying the Cocoon

The initial spraying operation bridges the tape grids with long cobweb-like filaments (Fig. 2). The spraying of these cobweb-like filaments is continued until a thin, translucent film is built up around the machine. This film need be only strong enough to withstand the spraying of subsequent regular coats without rupturing.

The "webbing coat" is next reinforced by subsequent applications of the cocoon solution (Fig. 3). This produces a package that is impervious to moisture, bacteria, fungi and the elements.

At this point the solvent vapors trapped inside the cocoon are released by cutting two holes, one near the base, and one near the top of the machine, and then removing the vapors with a fan or blower.

A suitable desiccant, usually Silica Gel, is next distributed inside the package. The holes that were cut to allow the vapors to escape, are now patched. This is done by spraying around the edges of the hole, placing a patch of cocoon material over it and spraying around the edge of the patch. If desired, a transparent vinylite window can be substituted for one of the patches. This allows periodic inspection of the interior. This package is suitable for shipping, or for storage periods of less than a year.

For storage under extreme conditions, such as extended outdoor storage, a top coating of Insul-Mastic, a Gilsonite base material is applied with a spray gun. This material, which has been used as a roofing material on freight cars, has a life expectancy of over 50 years.

With either package, a final spray coating of aluminum is recommended. In addition to furnishing specific protection against the actinic rays of the sun, this coating increases the general wearing qualities of the package.

When it is desired to remove the covering, a long slit is made in the cocoon with a sharp knife. The covering is then literally peeled from the machine (Fig. 4). There is no adhesion of the packaging material to the machine.

The moisture vapor transmission rates vary from 0.350 g. per 100 sq. in. per 24 hr. in the case of a cocoon .020 in. in thickness to 0.175 g. for a thickness of .040 in.

Summary

Advantages claimed for the Cocoon system are: (1) No special equipment is required—a spray gun and a supply of air are the only things necessary; (2) equipment of all sizes and shapes may be packaged—no predesigned forms are required; (3) no time is lost in applying greasy rust prevention compounds, or in cleaning them off when it is desired to use the equipment and (4) the cocoon is bacteriostatic and fungistatic, providing protection against mildew and mold as well as against the elements.

The Freezer Locker Plant Is Going Commercial

Small ventures in processing for local consumption have led to increased facilities for freezing fruits and vegetables. Expansion into meat curing, packaging and freezing operations is expected to be the next development

By HARRY CARLTON, Food Processing Specialist
Agricultural Extension Service, University of Tennessee, Knoxville, Tenn.

DURING the past few months the writer has been meeting with several hundred freezer-locker operators and prospective operators in the Southeast, and discussing with them individually and collectively their plans for future operations. Almost to a man they are now making, or planning to make, commercial packs of local products for local consumption. Many of them are seriously considering the erection of commercial packing plants.

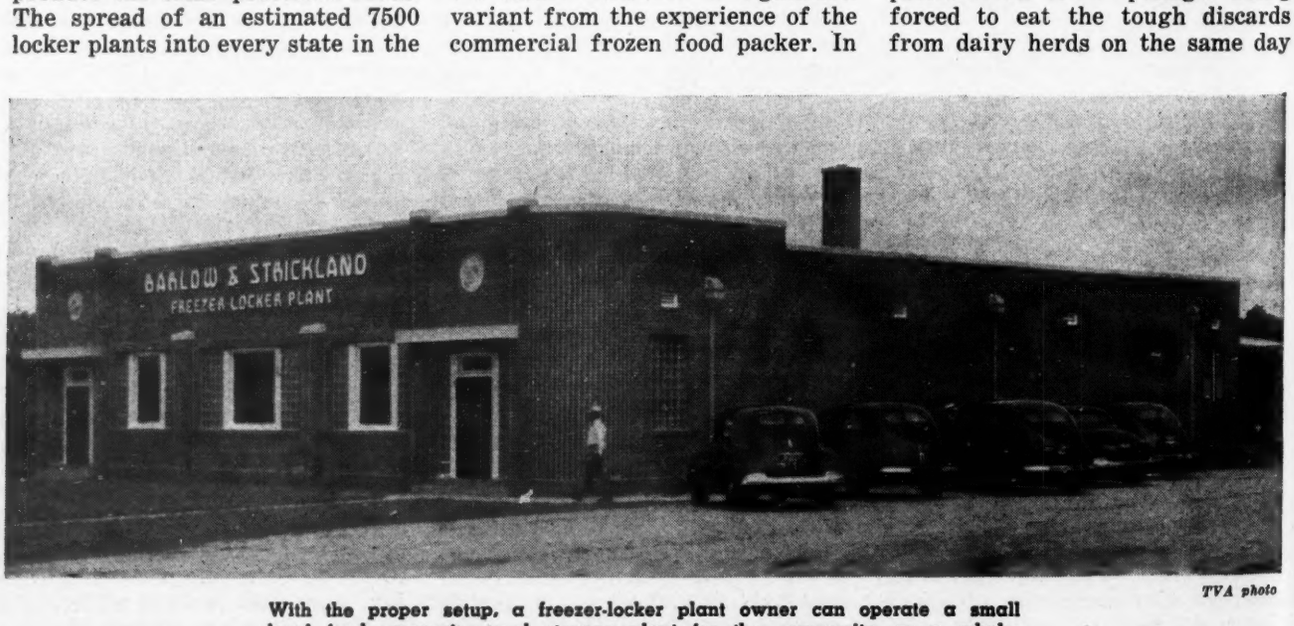
The development of a freezer-locker plant into a commercial frozen food plant is a natural, in some instances almost an inevitable growth. The locker operator and the frozen food packer work with the same raw materials, and approximately the same equipment, to produce the same processed foods. The spread of an estimated 7500 locker plants into every state in the Union during the past ten years, has paralleled the increased production and distribution of commercial frozen foods. The commercial packer, by his research and experiments, has aided the locker operator in achieving better handling methods and finer quality; the locker plant has helped materially in educating the consuming public, and in providing facilities for the distribution of the commercial product.

As a matter of fact, the freezer-locker plant has outgrown its name and become a community refrigerating plant or, in many localities, a community food service plant.

Slaughtering Included

Meats have always been the larger and more profitable branch of the locker business—a significant variant from the experience of the commercial frozen food packer. In the Midwest where beef is a principal agricultural product, the full service plant with facilities for taking the live animal from the farm, slaughtering, processing and storing the packaged meat in the lockers ready for the table, was a logical development.

In the Southeast, where from 30 to 40 percent of all farm butchered pork is lost on account of climatic conditions, salt curing, smoking, sausage making and lard rendering have become a large and profitable part of the plant operations. In most rural areas, beef is a scarce article of diet. Without refrigeration facilities, home butchering is impractical. Even the town butcher often has no walk-in refrigerator where meat can be hung for chilling and aging, or even for a brief preservation from spoilage. Being forced to eat the tough discards from dairy herds on the same day



TVA photo

With the proper setup, a freezer-locker plant owner can operate a small local food processing and storage plant for the community as a whole.

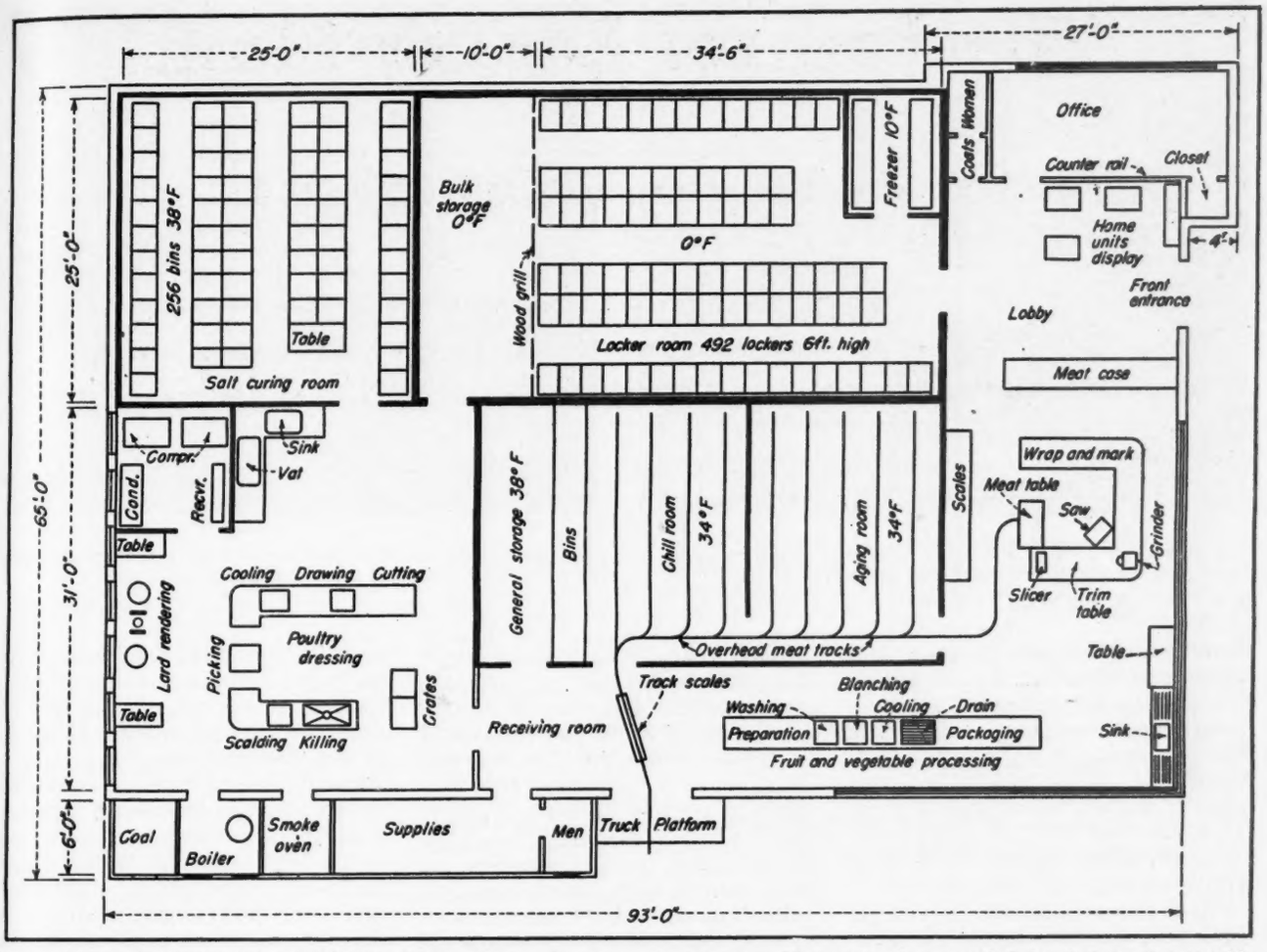


Fig. 1. Suggested layout for a 500-locker freezer plant. It provides, in addition to the locker room, a freezer, a chill room, an aging room, a salt-curing room, a bulk storage room and a general storage room. Space is also provided for fruit and vegetable processing, poultry killing and dressing, lard rendering and meat smoking. Note bulk storage at rear of the locker room.

the animal is killed, or after it has become slightly gamey, is hardly conducive to an appreciation of beef as a food.

The fine Whiteface and Black Angus cattle, raised by farmers attempting to get out of the cotton or tobacco one-crop rut, have been shipped to Chicago or St. Paul on the hoof; sometimes to return as Western beef with all transportation, processing, and profit charges included in its retail price. Practically the same conditions have existed with regard to other agricultural products. With only a few canning plants in the entire Southeast, the truck farmers have been obliged to depend on a fluctuating and uncertain fresh market as an outlet for their fruits and vegetables. These farmers have had to import their canned goods from other sections of the country.

The freezer-locker plant has long been recognized as a partial solution of this economic erosion of our agricultural resources. The Land Grant Colleges, the state agricultural departments, local chambers of commerce, farmers' cooperatives, the Tennessee Valley Authority, have all been interested in the problem of getting plants built in the localities where they are most needed.

First Plants Private Clubs

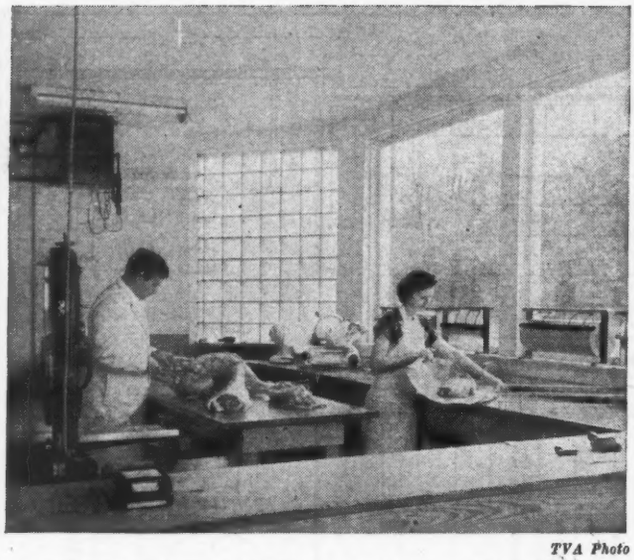
The first freezer-lockers were operated essentially as private clubs, serving their 50 to 1,000 locker renters. Under this club set-up, few benefits were enjoyed by members of the community who did not rent lockers. At the same time the locker owner was finding his business strangled by the limited storage capacity of a six cubic foot metal box!

A farm family's locker might be filled with strawberries early in the spring, with vegetables, or with fryers, or possibly with peaches. A quarter of beef filled a second locker, leaving no room for the calf which was ready for butchering a few weeks later, or for lamb, or pork, or a lucky catch of fish. No processing charges are earned by filled lockers, and without processing charges there are no profits, because rents at best, cover overhead and salaries only. During the war, with all lockers rented and a long waiting list, baskets, crates and cartons heaped with packaged frozen foods were allowed to pile up on top of the lockers and fill the aisles. Locker renters had to be warned to freeze only choice items and can the rest!

In other words, on a dollar and cents basis the locker plant lost much of its glamour as a desirable small business, especially in view of the rapidly mounting construction and operation costs. The logical solution, bulk storage to take care of the overflow from their customers' lockers, also provides the plant operator with zero storage space for his own products or for commercial products bought for wholesaling or retailing.

Layout Suggested

At the Southeastern Freezer-Locker conference for agricultural field workers held in Knoxville in September, 1944, an Engineering



TVA Photo

The processing room is located in the front of the plant, separated from the lobby by a meat case or service counter.

TVA Photo

Large adequately equipped salt-curing rooms provide a fine service to the community and a good return to the operator.

Committee was formed to study and make recommendations regarding the general construction, arrangement, and equipment of locker plants adaptable to Southeastern conditions. Their report* included a layout for a 500-locker plant (Fig. 1) which they offer as a suggestion or guide to be altered to suit individual community requirements.

With this general setup, properly equipped, the plant owner can operate a small local food processing and storage plant for the community as a whole as well as for his locker renters. It is an ideal pilot plant for an owner who contemplates entering the commercial packing field. Every locker renter, in cooperation with the plant operator, carries on a practical, if empirical, research project in the growth, preparation, freezing and storage of local agricultural products. And these rural housewives have no fixations regarding what cannot be done, neither do they suffer from inhibitions about trying out new products and methods! Their standards as to sanitation and quality are apt to be higher than is the case with the average commercial packer.

Considering the present lack of comprehensive frozen food technology courses in our universities, especially in the freezing of meats, a locker operator probably gets about the best training available for all phases of commercial freezing. In addition he learns local preferences and marketing conditions.

* "Planning a Locker Plant for the Southeast," University of Tennessee Agricultural Extension Service Publication, No. 294.

Small ventures in packing available products for sale to his renters or other local buyers, offer additional income for the operator and serve the community. The raw material, at first, is usually the accidental surpluses of local home or fresh market gardeners, such as strawberries, red raspberries, or other fruits; peas, beans, corn and quite frequently, local favorites not included in the lines of commercial packers, such as crowder and black eyed peas, "shelly" beans, turnip greens, etc. If these transactions prove mutually satisfactory, they may lead to more or less formal contracts with the growers for the particular products and in the quantities that the plant can handle profitably.

No Suitable Equipment

The lack of medium sized processing equipment, such as pea shellers, bean snippers, small washers and blanchers, for small quantity production coming between community canning operations and the large commercial packers, is becoming recognized by manufacturers and such equipment has been promised in the near future. The extra cost for hand labor made necessary by inadequate equipment is balanced by the combined wholesale and retail write-ups and the absence of transportation charges. It has been found that large operations are not essential to minimum direct-labor costs.

As his packing operations grow, the operator finds his facilities much too small. Also he may find himself in both the wholesale and retail frozen food business, especially if he has been handling commercial lines. At this point he starts to consider whether he would be justified in enlarging his packing and storage facilities, possibly to the extent of building a separate commercial packing plant. He calls in the Agricultural Extension Service to determine, not so much what items are now being produced in the area, as what products can be grown profitably, and in quantities sufficient to keep his plant operating for several months each year.

One pioneer freezer-locker in Tennessee, following this pattern, has grown into a full fledged commercial packing plant. A second plant is now in operation in another locality and the facilities of the original plant are being still further enlarged. Strawberries, wild blackberries, snap beans, peaches, apples, poultry and eggs are the main products which in normal times can keep this plant in operation for the greater part of the year.

Another Tennessee packer fitted up a pilot plant in a spare building in his ice plant with about the same equipment and capacity as a large locker plant. Starting with one of the most difficult of all commercial fruit packs, his first product was a top quality pack of 300,000 lb. of frozen apple slices. He has established himself with the trade as a quality packer, and is enlarging his operations as fast as he is assured of raw materials of the quality and in the quantity he needs to keep his plant in profitable oper-

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Australia's Agar Industry

Before the war, Japan was almost the sole supplier of agar, which became a carefully rationed item. The shortage was partly relieved by production of agar in America and Australia. Lowering of prices may now be expected

By ALEX MAKAROFF, Sydney, Australia

LAST YEAR Australia produced more than 20 tons of agar. Production figure for 1946 will be more than doubled. Within three to four years the industry plans to supply not only the 70 tons used annually in Australia, but also the whole of Great Britain's demand of 200 tons a year.

Australia's agar industry began early in the war. Methods devised in the laboratory were at first difficult to work out on a plant scale. Filtration of agar liquid after extraction was the principal stumbling block. Later, methods of extraction by use of pressure filters instead of suction filters were successful.

Price Situation

Despite a world shortage, only Australia, America and New Zealand have been able to develop an agar industry during the war. Before the war, Japan had a world export monopoly using primitive methods. About 2,000 tons were produced annually by Japan. Agar then sold at $1,200 to $2,100 a ton. Present price is $5,200 a ton. The Australian industry, however, believes that cost of production can be substantially reduced to bring the price down to $3,100 per ton. Construction of modern plants in the next few years will tend to reduce cost. With the installation of these modern plants, processing methods will improve and higher yields will be attained.

Although the process is relatively simple, agar manufacture is costly. Seaweeds cost only $0.05 to $0.10 a pound, and in Australia at present agar costs $1.75 to $2.50 a pound. Cost of powdered agar is always considerably higher than strip or flake agar. Although golden-yellow or greenish in color when dry, unless bleached with carbon, Australian agar forms a more transparent gel than Japanese agar. It also appears more elastic. Dry Japanese agar is white in color.

Agar Uses in Food Field

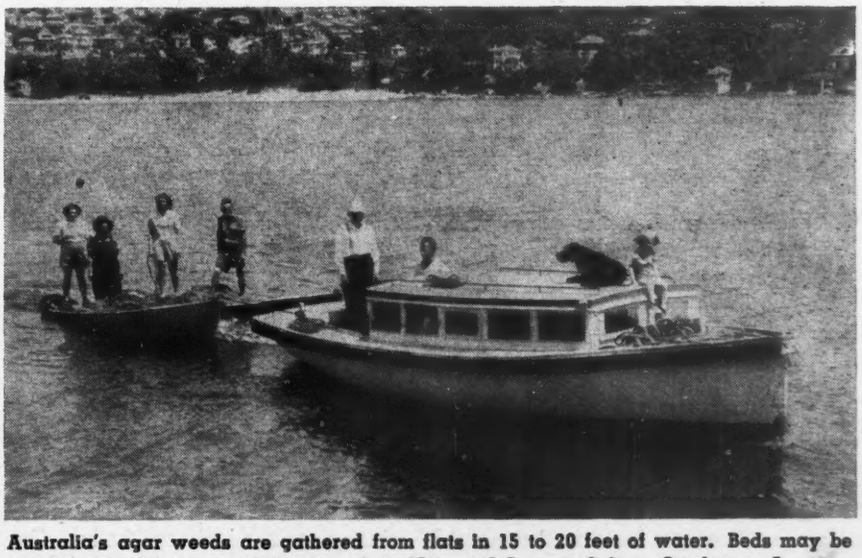
While a most important use for agar is in bacteriological media, there are many uses in the food field. Agar is used in bakery products to increase bulk. It is used as a stabilizer in sherbets and water ices. Malted milk and acidophilus milk are stabilized and thickened with agar. It is used as a gelatin substitute for fruit and vegetable jellies. In various custard preparations, jelly candies and marshmallow icings, agar is used. Meat canners use it as a gelling and thickening agent for meats, such as canned tongue. If agar is used in meat products, it must not be included in the net weight. Agar is not used in standardized food products at the present time. If used in non-standardized foods, the agar must be declared on the label with other ingredients.—The Editors.

While several seaweeds have been found suitable for agar production in Australia, the species *Gracilaria confervoides* is the most abundant and is chiefly used. This seaweed grows on rocks and stones in about 15 to 20 ft. of water. Beds may be anywhere up to two feet deep.

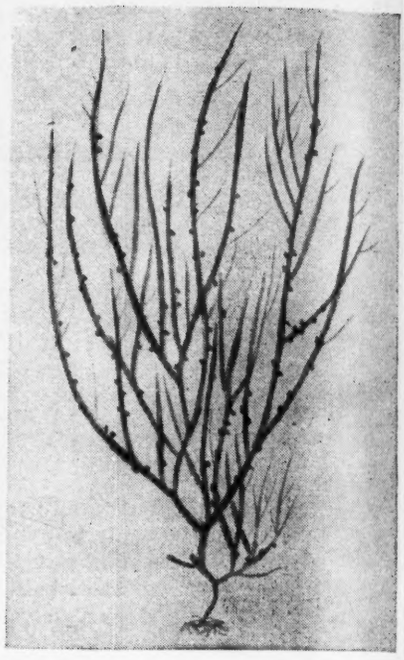
Main agar weeds found in Australia are growing in Botany Bay and Middle Harbor, Sydney, in the Big Lake near Yamba on the Clarence River and in Moreton Bay. They also grow at times in non-profitable quantities in other areas. In Western Australia, a small agar industry uses the rock seaweed, *Eucheuma*. This weed washes up on beaches, is collected and bagged, but agar is not manufactured in this area.

Harvesting Agar Weeds

Very pure seaweeds have been harvested in various beds, since *Gracilaria* does not generally mix with other weeds. There are two crops of *Gracilaria*, one in May-June and a second in October-January. Flotsam harvest is supplemented by harvesting from the sea-bed. In many areas weeds are washed ashore. Much of it, however, is buried in the sand and lost. Fences have been erected about four feet below tide level in order to minimize loss by preventing the weeds from reaching beaches. The weeds hang in front of the fence,



Australia's agar weeds are gathered from flats in 15 to 20 feet of water. Beds may be two feet deep. Crops are harvested in May and June and from October to January.



(Top, right) *Gracilaria confervoides*, is the most abundant of the seaweeds for agar production in Australia. It grows near shore on rocks and stones at low-water mark.

(Top, left) Soon after harvesting, the seaweeds are sorted and dried on wire racks. It takes seven tons of wet, drained seaweed to produce one ton of dried seaweed.

(Left) Dried weed is baled and shipped to the Riverstone Meat Works, in Granville, Sydney. Here the dried seaweeds are extracted and purified to make agar.

thus making harvesting easier. In some suitable areas *Gracilaria* has been planted, but results have not been determined so far.

Drying tests have shown that the weeds can be dried successfully on wire racks. However, drying of weeds on grass has been found easier. Artificial drying, on the other hand, has not been successful. While chlorine serves as an effective bleach, its application reduces the gel strength of the agar to a considerable extent.

Gel strength of Australian agar seems to be greater at higher concentrations and less at lower concentrations than Japanese agar. The gel is more transparent, and syneresis seems relatively greater with the result that the feel is more slimy. Australian agar produces an excellent gel in canned meats. It is also suitable for dairy and confectionery products as well as bacteriological media.

One ton of dried, dark *Gracilaria* is produced from seven tons of wet, drained seaweed, while one ton of clear, bleached *Gracilaria* is obtained from eight tons of wet, drained seaweed. At Riverstone Meat Works, Granville, Sydney, the only Australian factory producing agar, the following procedure is used: Weeds are boiled in 96 percent water. A recovery of about 33 percent is obtained. Three tons of seaweed must be boiled to produce one ton of agar. Seventy-five tons of water are necessary for the first extraction and 50 tons for the second extraction (if a second extraction is made). Each extraction takes two to three hours. Vats hold 15,000 gal. of liquid. Centrifuges handle 15,000 gal. per day. Filters and evaporators handle 15,000 gal. The amount is reduced to 10,000 gal. or 50 tons when the agar liquor is to be frozen. Frozen agar is sold as ten percent solution.

Analytical Methods

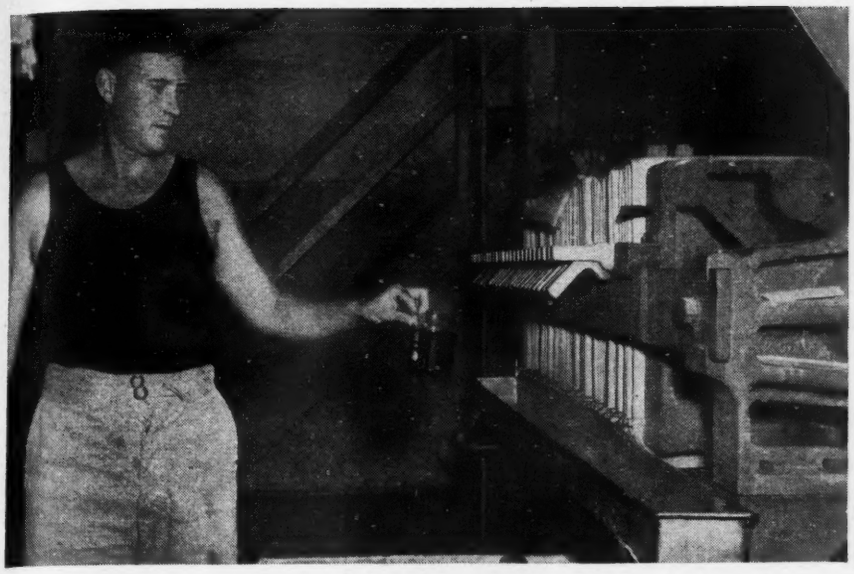
The manufacturing process starts at the sampling of the weeds. Quality of seaweed and probable yield of agar can be ascertained by preliminary analytical methods. Small representative samples are taken so that the amount of inorganic and organic impurities can be calculated.

To determine the percentage of pure agar in the weeds, the following procedure is undertaken: Ten grams of seaweed are heated at 95 to 98 deg. C. in 250 ml. of water for two hours. Three extractions are made. Aliquots are taken from each extraction and added while still warm to a given volume of alcohol. The resultant precipitate is filtered through a tared filter, dried, weighed and the percentage pure agar calculated.

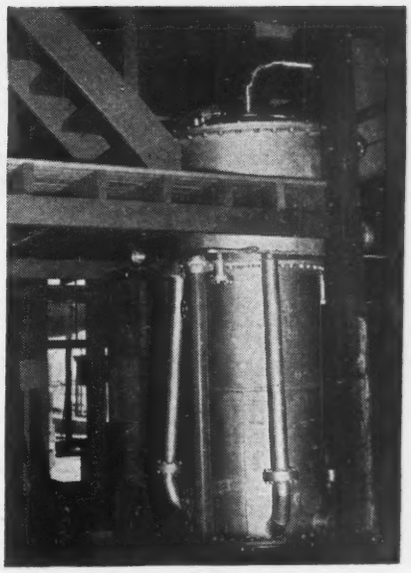
Manufacturing Process

Before the seaweed is shipped to the processing plant, it is spread on racks to dry. Foreign seaweeds, together with other impurities, are sorted out. After the seaweed is dried, it is then pressed into 1 cwt. bales ready for shipment to the Riverstone Meat Works where it is processed into agar.

Seaweeds are washed with beaters for 10 to 30 minutes in order to remove sand and other impurities. They are then cut up in a mincer or chaff cutter and transferred to cookers. Counter current or diffusion battery system of cookers is recommended. Live steam is used to heat the weeds at a temper-



After extraction for two to four hours in water at 96 to 98 deg. F., the liquor is centrifuged, treated with activated charcoal and filtered with filter aid.



At this point the filtered agar liquid is concentrated in aluminum evaporators.

ature of 95-98 deg. C. Weeds should be added not in excess of four percent of the amount of water used, otherwise extraction takes two to four hours. Prolonged extraction tends to produce partial hydrolysis and reduce yield.

After extraction, the hot liquor is then centrifuged. High sludge capacity or continuous sludge removal centrifuges are used. Efficient removal of agar liquor is accomplished. From the centrifuge, the liquor is run into steam-jacketed or coil-heated tanks where activated carbon is added. The agar liquid is then filtered through a plate and frame press with the addition of filter aid. A brilliant and colorless liquor results. The liquor at this point contains 1.0 to 1.5 percent agar. It is concentrated by boiling under vacuum. Overheating may cause hydrolysis and resultant loss of gel strength.

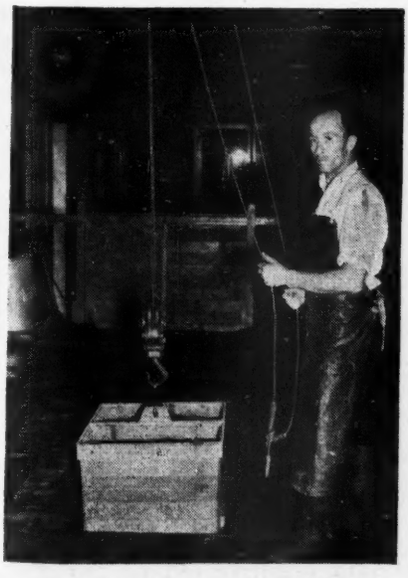
The liquor is then allowed to gel either in ice cans or in slabs, and frozen in brine or in air. Freezing is effective and reasonably rapid at 21 deg. F. The object of freezing is to remove impurities which cannot be removed in other ways. Gel strength is also increased four to six times. Such increases do not occur without freezing unless a more expensive method is used.

The agar-ice is thawed out in water at about 35 deg. C., and centrifuged. Or, it may be crushed first in an ice-crusher or chopped up after thawing, when it separates as a crepe-rubber-like mass. The agar is then dried to a strip or flake agar in a drum drier.

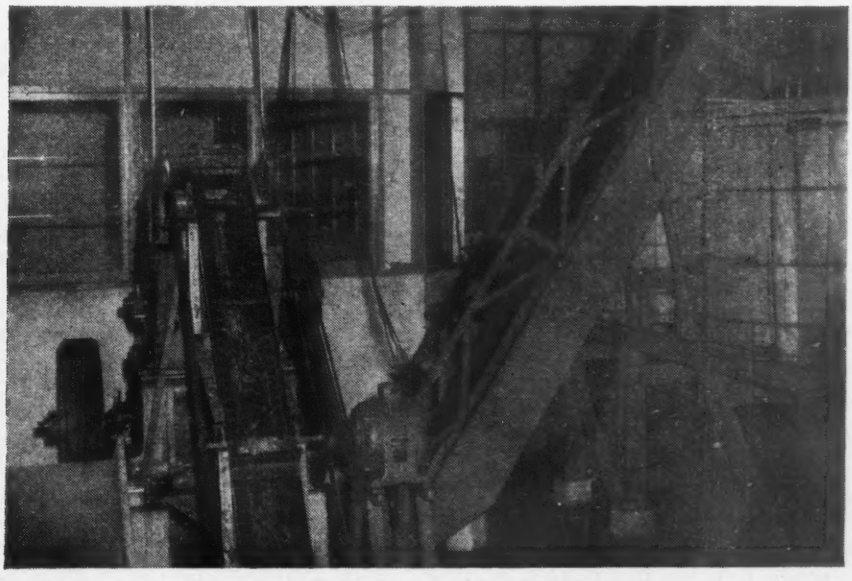
As the industry grows in Australia, price of raw material will stabilize itself. If it is found possible to lower cost of collection, then this would justify using the costlier method of bleaching by activated carbon to give a higher-grade product. In this way it may be possible to compete on the world market at pre-war prices for agar.

Acknowledgment

The assistance of E. J. Ferguson Wood, and the Fisheries Division, Council for Scientific and Industrial Research is acknowledged.



Liquor is gelled in ice cans and frozen in brine to remove all of the impurities.



Conveyors and other equipment used in final purification stage of the process. Construction of modern plants in the next few years will tend to reduce costs.

Better Lighting: Better Work

Part I—Adequate illumination in food manufacturing plants will increase production, improve quality and prevent accidents. But, mere abundance of light does not mean good lighting. Quality of illumination is important.

By JOHN S. WALSH, Illuminating Engineer
Pacific Gas and Electric Co., San Francisco, Calif.

For sorting and grading, a high lighting intensity is needed. General room illumination should be considerably lower.

DURING the war, production was so important that the War Production Board published a booklet on "Plant Efficiency," for distribution to small and medium-sized manufacturing plants and their employees. It had one purpose—to help war plants do a bigger, better, and faster job of producing. The booklet offered helpful suggestions on a number of topics—cutting down accidents, adapting old machines, maintenance and repair, meeting government standards, training workers, swing shifts and the like—but there was one topic so important that the WPB put it first and called it "Good Lighting—Better Work."

Quoting the first few sentences: "Good lighting sharpens the worker's most important faculty—sight. It is an effective means of increasing efficiency and maintaining production at a high level." A well-designed lighting system results in:

Increased production
Better workmanship
Continued production by older employees
Less eyestrain
Reduction in accidents
Better morale
Better housekeeping

But mere abundance of light does not constitute good illumination. We've gotten away from stringing bare lamps on drop cords. An adequate lighting installation in your plant should meet three main requirements:

1. Enough light for all visual tasks. It is obvious that higher lighting intensities are needed for sorting and grading, for example, than in a cook room. And, more illumination is needed in the cook room than in a warehouse or storage space. That means a balanced lighting installation.
2. The absence of glare. Glare is defined as any bright light source within the field of vision causing annoyance, discomfort or eye fatigue. It can be produced by a bare lamp, a poorly designed or wrongly placed lighting fixture, light from a window or reflection from a glossy surface.
3. Proper distribution and diffusion of light. Whether it is natural or artificial or a combination, light should be distributed evenly over the entire area, except that there should be a higher intensity on critical work.

Light Meters Needed

To check the heating in your plant, you use a thermometer. Heat is measured in degrees, usually Fahrenheit, and we're all familiar with the fact that water freezes at 32 deg. and boils at 212 deg. at sea level, that 72 deg. is a comfortable temperature. We know 40 deg. is cold, 110 deg. is hot.

Your lighting can be checked too. Illumination on a working surface is measured in foot-candles. One foot-candle is the illumination produced at a point on a wall opposite and one foot from a candle flame. Just as your thermometer measures heat, a foot-candle meter measures light. The meter, (Fig. 1), is small and inexpensive—about $12—and your lighting has such an effect on safety and production that every food plant superintendent should have one. Your power company will be glad to loan you a meter to check the seeing conditions in your plant, to find out if your lighting is helping or actually handicapping production and safety. With the aid of a light meter, it may be possible to readjust or relocate your present lighting units to put more illumination on the work and—something that will probably astonish you—to find out how much more light you'll get when the fixtures are cleaned and old lamps replaced.

As you look at the scale, the red section, 0 to 10 foot-candles, is marked "Inadequate for Most Tasks." Your warehouse or storage space might be 10, as the work there does not require such concentration, and seeing tasks are simple. More difficult seeing tasks require more foot-candles. Office work, ordinary bench work, drafting and fine assembly are increasingly difficult seeing jobs and the minimum lighting levels required are correspondingly higher. For readings above 75 foot-candles, a special cover or "multiplier" is provided for the light sensitive cell on top of the meter, and the scale readings should then be multiplied by ten.

Illumination Levels

Now for a few values or reference points, like freezing at 32 deg. and boiling at 212 deg. F. Out in the bright noonday sun, the illumination may run to 10,000 foot-candles. Under the shade of a tree on a clear day it may be 500 foot-candles, and that's a comfortable condition, like a 72 deg. temperature. Nature provides light in generous quantities, but the quantity varies from hour to hour, and as clouds come and go across the sun. Next to a window we might have 200 foot-candles but as we go away from the window the illumination drops off rapidly. Daylight alone is inadequate and unsatisfactory for most interior work.

Artificial lighting, whether by incandescent, fluorescent, cold cathode, mercury or other source, can be installed in your plant to give the amount and quality of illumination you need for every operation, and it remains constant at all times. What foot-candle levels should you plan for? I think we'd all like to work under that shade tree on a clear day, 300 to 500 foot-candles. Unfortunately, light sources and the art of illumination haven't advanced to the point where those intensities can be economically produced for you indoors.

Study of Canneries

What lighting engineers have done through their technical organization, the Illuminating Engineering Society, is to establish certain recommended values of illumination, depending on the difficulty of the work. Very intensive studies have been made in many industries, such as printing, shoe manufacturing, candy making, silk and rayon plants. Recently, an I.E.S. committee of lighting engineers in the northern California area, including a representative of the National Canners Association, has been studying the lighting requirements in canneries for the purpose of preparing detailed recommendations on the proper illumination for sorting and grading, trimming, cooking, canning, labeling, casing and storage. Indicative of the importance of proper lighting to canneries, the National Canners Association has made a grant to support a research fellowship at the Stanford University illumination laboratory in Palo Alto.

At the present time, the "Recommended Practice of Industrial Lighting," published by the Illuminating Engineering Society, is the guide generally available on lighting standards in industry. Unfortunately this recommended practice, while giving detailed recommendations for a number of other industries, casually dismisses our entire problem by saying, "Canning and Food Processing—20 Foot-Candles Minimum In Service." Experience indicates that 20 foot-candles is more than the minimum required for receiving and storage areas but certainly not enough for inspection work.

Since there are now no accepted detailed standards for lighting in the canning industry, we might discuss the problems involved, and then consider some general recommendations based on standards and present day practice for comparable work in other industries.

Quality of Lighting

There's a lot more to proper lighting than providing foot-candles. The absence of glare, proper light distribution and diffusion, and color quality are equally important. All of these have significant effects on visibility—seeing easily, accurately and quickly.

When checking your lighting for glare, don't think of the light sources, but rather of the work and the worker. A quick general test for glare is to:

1. Put yourself in the normal working position of the worker.
2. Close your eyes for a few moments.
3. Then open them and observe. What is it you see first and most clearly? If it is something other than the work, there is probably glare present.

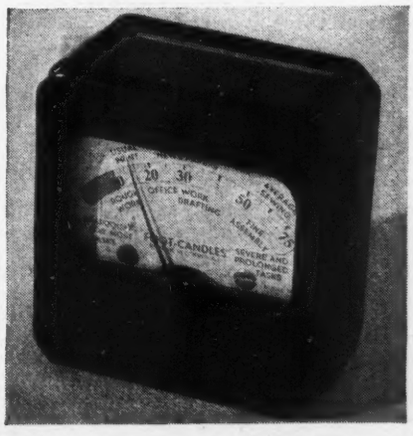


FIG. 1. With the aid of a foot-candle meter it is possible to determine the lighting intensity at any point in the plant. Occasional checks will indicate depreciation in illumination due to dirty reflectors and darkening of lamps.

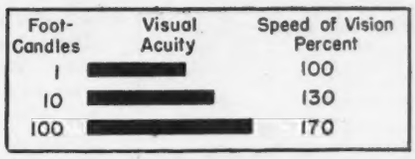


Fig. 2. Shows increase in visual acuity as intensity of illumination increases.

There are three common types of glare, direct and reflected glare from artificial lighting sources, and daylight glare from windows or sunlight reflections.

Contrast

Along with glare, brightness contrast must be considered. A high concentration of light on the work and dark, contrasting surroundings create a difficult combination for the eyes. The pupil of the eye is forced to adjust itself alternately to high and low levels of illumination. This wastes time and consumes a certain amount of energy. Perhaps you've gone to a movie in the afternoon from a bright daylight world of several thousand foot-candles into the equivalent of low starlight, a few thousandths of one foot-candle. For several seconds you are practically blind. The usherette takes you down the aisle by the arm, you crawl over people, walk on their feet, and fumble around until you find the empty seat. That's an extreme in brightness contrast, but it does illustrate the principle. In other words, it takes time for the pupil of the eye to adjust itself to different levels of illumination.

As a practical application, don't concentrate lighting on a cooker, a closing machine, a sorting or cutting table and leave the rest of the room dark. Every time the workers look up for a moment to rest their eyes, their pupils expand. When they look down on the brighter work, their pupils contract. The work should never be illuminated more than 10 times as brightly as the surroundings, and preferably less than five. If the illumination on a sorting table or belt is 100 foot-candles or more, the illumination in the room itself should never be less than 10, and preferably about 30. Walls and ceilings should be painted in light color, not only to minimize the contrast between work and surroundings, but also to give maximum reflection and to reduce shadows. Painting is important to proper illumination, cheerful surroundings and cleanliness.

There is another reason for good general illumination beyond mini-

How direct glare (left) caused by a bare light source over the table, puts too much light in the worker's eyes, too little on the work itself. Shading the bare lamps (right) not only directs the light where it belongs, but may save up to 60 percent of the light that might be wasted on walls and ceiling.

The reflected glare (left) is often more objectionable than direct glare. It is caused by wrong location of lighting units and poor diffusion of source brightness. Relocating the lighting fixtures (right), or changing from a concentrated source to a large area source is recommended.

Any daylight glare (left) makes seeing difficult when the job is between the worker's eyes and the windows. Bright patches of sunlight on walls and floors, or anywhere in the field of vision, are very annoying. Shade the windows (right), or shift the work to put daylight on it instead of in the eyes.

mizing brightness contrast. Adequate lighting throughout the plant will show up accumulations of rubbish, and provide a powerful incentive for removing or preventing them. It is difficult to see under conveyors and machines and into dark corners. These can easily become dumping grounds for debris, contributing to accident and fire hazards, destroying morale and decreasing the quality of work. Housekeeping and sanitation are easier with proper lighting, and this is particularly true of toilet and wash rooms.

It takes time to see, but it's easy to prove that more light shortens that time. A baseball pitcher likes a dark day because the batter can't follow the ball fast enough and batting averages go down. A ball pitched at the same speed appears to move slower in bright sunlight than it does when the sky is overcast. That is because the eye, like a camera, can take pictures faster when the amount of light is increased, (Fig. 2).

It has been demonstrated by laboratory tests that the average person can see 70 percent faster with 100 foot-candles than with one.

Speed of Vision

Speed of vision is important in preventing accidents. One poorly lighted cabinet maker's shop in San Francisco called for a lighting engineer recently. In the whole shop there was only one man with all ten fingers. Lighting alone won't prevent accidents, but it's recognized by the Federal Department of Labor and by the California State Division of Industrial Safety that there is a close relationship between lighting and the accident rate. Instead of investing in accidents after they happen, why not invest in illumination and prevent them?

You've all noticed that light acts as a magnifying glass—allows you to see details more clearly and accurately. Look out of a window at noon on a sunny day and see how far you can recognize the features and expressions on a person's face. Try it again toward dusk and see how much nearer he has to be to get the same detail. We found out during the late war that one can see with very little light, but only at the sacrifice of speed and accuracy.

For decades, vision has been tested with the standard Snellen eye chart. And yet a person may test 20/20 with 100 foot-candles of illumination on the chart and only 20/40 with one foot-candle on the same chart. Testing vision at the proper distance from the chart signifies little unless the amount of light on the chart is specified. Increased illumination brings objects closer, apparently magnifies size.

While there is no doubt that better lighting improves seeing, a fact that may be surprising is that improved lighting helps older workmen much more than it does the younger. Nearly every established plant has a number of older employees whose skill and experience are invaluable. But visual acuity decreases with age, the lenses of the eye lose some of their elasticity. More light helps to make up for failing vision.

Recommended Intensities

With this background, it may be seen that the intensity of lighting required in the various areas depends upon the seeing tasks encountered there. The following recommendations are based upon: (a) Careful consideration of the principles that have been discussed, (b) lighting standards for comparable work in other industries, and (c) limiting economic considerations.

Receiving and Storage Spaces—About 10 Foot-Candles. In these areas, you may be checking can marks, running fork lift trucks, stowing cartons and the like. Adequate lighting will certainly speed up receiving and

(*Turn to page* 232)

Truck Frozen Shrimp Over Desert Roads

Regular 600-mile run from California to Arizona is made in less than rail shipment time, twice each week. Produce is hauled on return trips

OVER 600 miles of desert roads with 20 tons of frozen shrimp is the unusual motorized food run operated by Pat Liberty from Los Angeles to Phoenix, Tucson and Nogales, Arizona. At an average road speed of 25 m.p.h., the run is made in 24 hours as compared with from 2 to 4 days by rail due to delays enroute for additional car refrigeration.

The run is made profitable from a cost standpoint by the haulage of loads of produce on the return trips. The truck rates are higher than the rail tariffs but are more than offset by the greatly reduced time of delivery.

The operation is a common carrier run for revenue. That is, Mr. Liberty does not own any of the food products hauled, but merely transports them for Los Angeles shrimp commission houses on the way out and for produce companies on the way back.

Due to the high road temperatures over the route covered, the trailer body is both insulated and refrigerated. The cooling equipment is such that it keeps the load at the temperature at which it is loaded.

Twenty tons of shrimp in one load are a lot of shrimps. The unit has been engineered up to the top limits of the allowable gross weights and axle loads of the States of California and Arizona.

As shown in the accompanying illustration, the vehicle consists of a tandem-axle tractor and a tandem-axle semi-trailer. This gives a total of five axles and eighteen tires.

The tractor is a heavy-duty Sterling equipped with a 200-hp. diesel engine. As shown in the accompanying illustration, the exhaust pipe of the diesel is carried vertically to a point just above the roof of the trailer body so as to avoid having the exhaust strike the body.

Because of the length of the run and the Interstate Commerce Commission Motor Carrier Bureau restriction that no driver may drive for more than 10 hours at a stretch, two drivers have to be employed on the run. When one driver is driving, the other is sleeping in the rectangular-shaped compartment mounted on the tractor frame directly in back of the cab.

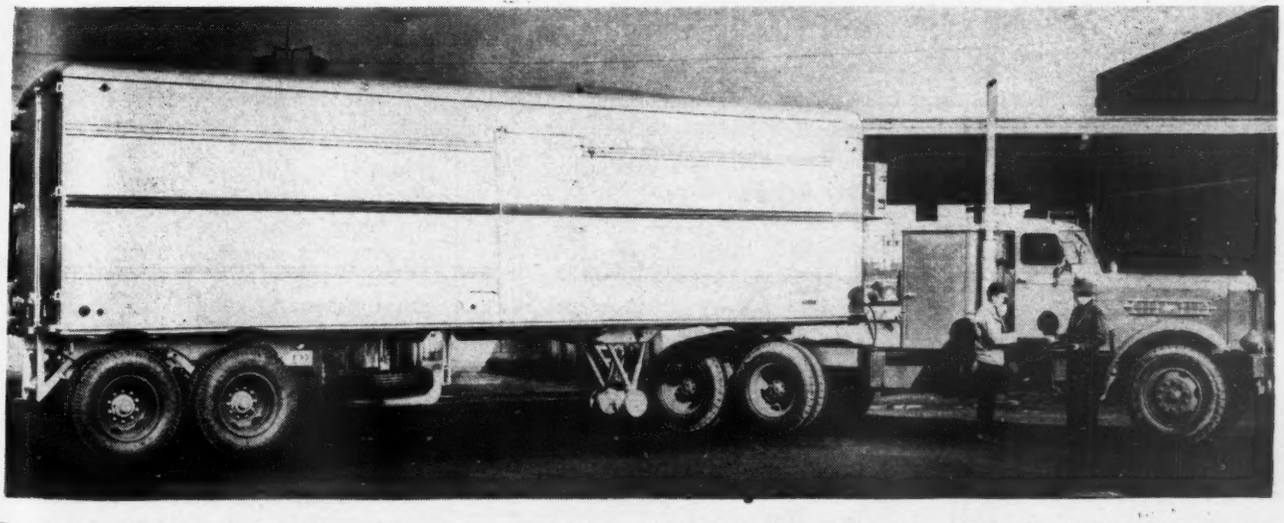
Truck Construction

The trailer is a regular Fruehauf Aerovan type in which the frame and body construction are integral. The inside body dimensions are 34 ft. long, 7 ft. 3 in. high and 7 ft. 3 in. wide. This gives a volumetric capacity of 1,787 cu. ft.

Fiberglas insulation is used all around in the trailer body. It is 3 in. thick on the sides, ends and roof with one layer of Sisalcraft plus ½-in. air space and the balance of Fiberglas with plywood lining on the inside. The floor is of 3-in. Fiberglass.

The refrigeration unit is a Thermo-King with the small gasoline engine driven compressor mounted on the nose of the trailer just below the roof. The outfit is not employed to bring down the temperature of the load in transit but merely to keep it at the temperature at which it is loaded. Airtight rubber gaskets on all doors are used to eliminate body leaks.

To assist in the maintenance of the interior body temperature, the outside trailer body is painted with aluminum for maximum reflection and minimum heat absorbtion.



Twenty tons of frozen shrimp are carried one-way and similar loads of produce are hauled on the return trips by the above Pat Liberty tractor and trailer between Los Angeles and Nogales, Ariz. The run is 600 miles each way. The trailer body is insulated and refrigerated and maintains the loads at the temperatures at which they are loaded. The overall length of the unit is 60 ft., which includes a 35-ft. Fruehauf Trailer and a Sterling tractor with a 200 h.p. diesel engine.

For quickness in loading and unloading, double, full-width rear doors are used with heavy hinges and a center air-tight locking mechanism. One single door of the refrigerator type is fitted on the right side of the body for use where side loading or unloading is more convenient.

Full Automatic

One other unusual feature of the trailer is that it is of the full automatic type. This means that the trailer is connected with and disconnected from the tractor mechanically instead of manually.

After the air brake hoses are disconnected by hand, the full automatic trailer is separated mechanically from the tractor by the driver throwing the disconnecting lever in the tractor cab and driving the tractor forward. As the upper half of the fifth wheel on the trailer is disconnected from the pin extending up through the lower half of the fifth-wheel on the tractor, a linkage arrangement on the trailer pulls the landing gear downward until the wheels touch the ground and the trailer is self supported.

Connecting the Trailer

In the reverse operation of connecting the trailer to the tractor, the latter backs up under the trailer and as the two parts of the fifth-wheel become fully engaged, the trailer wheels are lifted clear off the ground and the unit is ready to move after the air brake hoses are connected by hand.

In the manually-operated trailer, the disconnection is made by the driver first opening the fifth-wheel locking device and then lowering the landing gear until the wheels are in the down position before pulling the tractor out from under thus allowing the wheels to touch the ground. The connection is made in the reverse manner, the wheels being raised to the up position by a hand crank.

Because of the wheel lifting and lowering mechanism of the automatic trailer, it is more expensive than the manual type. It is most commonly used when the trailer has to be disconnected several times a day from the pulling tractor or tractors as when used on route deliveries such as those of wholesale grocers. Then the automatic type, because it enables the connections to be made more quickly, conserves more of the driver's time for driving and unloading.

Most Are Normal

Most common carrier trailers are, however, of the manually-operated type because of the lower initial cost and the fact the trailer is disconnected only at each end of the run and then only if another trailer is loaded in advance and immediately ready for the tractor to haul on its return trip. The use of the full-automatic trailer on the Pat Liberty run is thus unusual.

In answer to the question as to why the full-automatic type was used, Mr. Liberty advises that other fleet owned tractors, which he could obtain as a substitute for his own tractor in case of a breakdown, are of the full-automatic type. In the latter type the fifth-wheel pin, which serves to join the two halves of the fifth-wheel is on the lower half of the fifth-wheel on the tractor. In the manually-operated type, the pin is on the upper half of the fifth-wheel on the trailer. Hence a tractor with a full-automatic fifth-wheel cannot hook up with a trailer with a manually-operated fifth-wheel or vice versa.

The overall length of the unit is 60 ft., the legal limit in the States of California and Arizona. The vehicle tires are one of the largest sizes of commercial road tires, 11.00 by 22. The same size is used all around on both tractor and trailer, so that one spare tire serves as a replacement on all 18 wheels.

These large tires when mounted on rims weigh over 100 lb. each. As a result, it is no child's play when they have to be changed enroute.

To make the work of tire changing easier, the trailer is fitted with a one-man type of tire carrier. As shown in the accompanying illustration, this carrier consists of a hinged framework mounted under the trailer floor just ahead of the wheels.

When the hinge is opened and the framework swung downward, the spare tire is slid off onto the ground without dropping. When the damaged tire is rolled to the lowered carrier and tipped over onto it, the latter is swung upward into place without having had to lift up the tire itself.

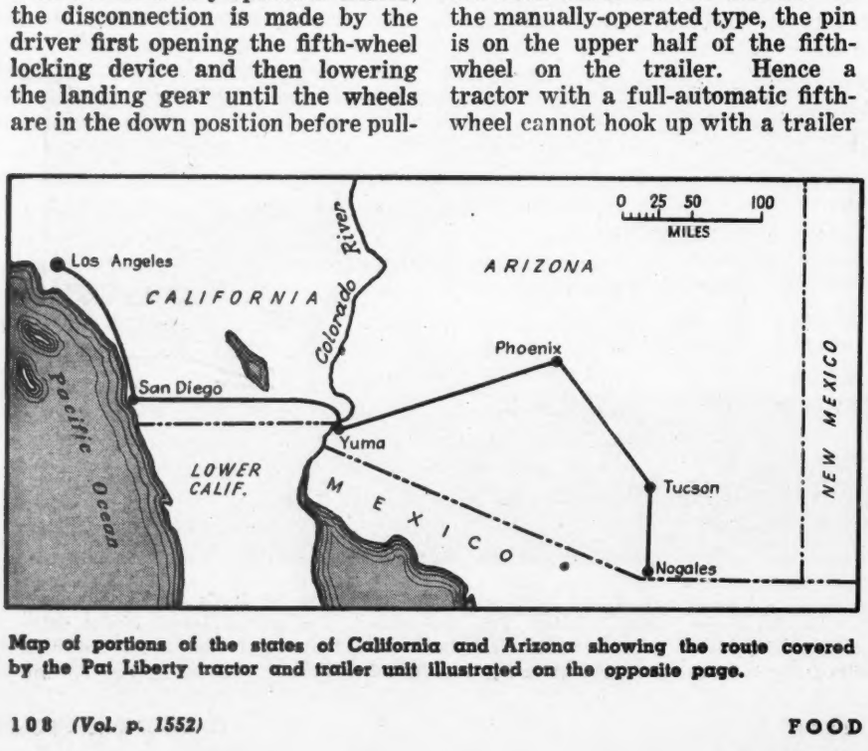
125,000 Miles a Year

Mr. Liberty estimates that the vehicular unit above described will operate 125,000 miles a year on the Los Angeles to Nogales run as shown in the accompanying map. At 1,200 miles per round trip, this is approximately 100 trips a year or two trips a week.

The run is operated by Pat Liberty and his brother Frank and was inaugurated after the end of the war in the Pacific where Pat Liberty, serving as a Seabee, directed road transportation in the Solomon Islands.

The Liberty Los Angeles-to-Nogales run is perhaps typical of an anticipated great increase in the distribution of food products by automotive equipment. The post-war construction of roads capable of carrying axle loads of up to 25,000 lb. goes hand in hand with the development of dual-axled tractors and trailers with the tractors having engines of sufficient power to move the gross allowable loads at maximum allowable road speeds even when ascending grades.

Along with the development in the vehicles has come a rapid advancement in self-contained refrigerating systems that permit even the most perishable foods to be delivered without spoilage.



Map of portions of the states of California and Arizona showing the route covered by the Pat Liberty tractor and trailer unit illustrated on the opposite page.

EDITORIALS

LAURENCE V. BURTON, Editor

Then and Now

JUST 27 years ago, the National Canners Association was engaged in a nation-wide effort to stimulate increased consumption of canned foods. Expansion of the industry in the first World War had led to the need for spurring the domestic markets to take more.

Today, despite new competition from frozen and fresh prepackaged produce, and a much larger capacity to produce, the canners face no such problem. Furthermore, their 1919 fear that consumers might lack confidence in canned goods has been replaced by the 1946 effort to produce enough to satisfy the market.

Price Control Confusion

PAUL A. PORTER of OPA got a break in September when Henry A. Wallace diverted public opinion from the problems of food scarcities to the more spectacular problems of international discord and quarrels in high places. And, Mr. Porter, apparently imbued with ambition to run everything in the manner he believes to be best, lost no time in pressing the Decontrol Board to give him further powers to control prices of milk and all manufactured dairy products.

It is difficult to believe that Mr. Porter is only carrying out the intent of Congress. His desire for more and more power betrays a zeal that bodes ill for the future. A really good administrator is never one who regards his appointment as a heaven-sent opportunity to impose his will on his fellow man, but rather is one who does his job as set forth in the statutes and no more.

The American people may as well face the fact that meat will be scarce for some time to come. One need only drive for a day through the Corn Belt to realize the scarcity of meat animals. In anticipation of a restored OPA, farmers had sold about everything that could walk during the free market days, retaining only enough to use up the expected feed supply. If Mr. Porter succeeds in enforcing price controls, the farmers will sit back and wait until markets are again free from restraints sometime in 1947 before again marketing animals in quantity.

The particular sufferers from price control are the several thousand packing house workers whose jobs have been sacrificed so that we may have a scarcity of meat at controlled prices. The meat packing companies, most of which must operate for the next few months under heavy losses, likewise suffer.

John L. Lewis put in his 2-bits worth in a plea for more meat for coal miners, thereby espousing the cause of free markets and no controls.

Organized labor demanded price control. They now have it, but do not like it. The outlook is very clouded, indeed.

Higher Living Standards for India

HIGHER standards of living for other peoples is the basis for predictions of increased foreign trade. The visionaries seem to forget that few people really *want* a higher standard of living strongly enough to work for it. A French philosopher once said, "Oh, the wantlessness of the poor!" People who want higher standards work hard enough to get them.

The whole problem of how to achieve higher standards of living is soon to receive a wholesale test in India, for that nation is intent on industrializing itself as well as improving its food resources. But as one of the native leaders of India has recently phrased it, "We will next need to find some way to make the 300,000,000 people of India *want* what will be available."

A hustling, bustling India would be a striking innovation.

Labor to Abandon Its Freedom?

ORGANIZED LABOR has a much greater stake in private enterprise than it realizes. If private enterprise, as a method of doing our daily work, should largely pass out of existence the world would keep on functioning, but private enterprise would be replaced by public enterprise.

Public enterprise is nothing but business operated for the benefit of the public instead of for profits for its owners. Public enterprise—call it socialism, state capitalism or communism—is never as efficient as private enterprise. People do not lie awake nights to scheme for better service to the public the way they scheme for better profits for themselves.

In the long run it will inevitably come about that strikes cannot be permitted in businesses operated as public enterprises. It is difficult to believe that American workers would knowingly abandon their liberties. Yet the conclusion is inescapable that slow downs, sit downs, strikes and shut downs are the shortest way to compel the adoption of the public enterprise system—something like the Russian method.

To those who cherish the right to strike, Russia should be an object lesson. In the Soviet Union, labor is not exactly under compulsion to work. But the Russians have a very clever way of attaining the same objective: the worker who is in disfavor is deprived of his ration cards, his sources of the

necessities of life, and if his friends refuse to share with him he can virtually starve to death.

Public enterprise cannot function without compulsory labor. Private enterprise cannot exist long without profits. If misguided organized labor persists in its present policy, the foreseeable end some years hence will be compulsion to work under the dictation of a central government.

Mr. John L. Lewis's oft repeated remark that "you can't dig coal with bayonets," is probably true under today's conditions but nothing so crude as a pointed "persuader" would be needed. If the time should ever come when all business is done for public service and none for private profit, denial of the right to participate in or to share the public services will soon prove to be a "persuader" more potent than bayonets.

Organized labor would do well to think through on its present course of action. It leads to something other than a worker's paradise.

Sanitation Drive

IN SEPTEMBER "Food Industries" we pointed out that the cleanliness and sanitation drive in New York City could conceivably be extended from public eating places to industrial food plants. Between the time the editorial was sent to the printer and its publication, the municipal health department of New York went to work on retail bakeries and announced it would next go after wholesale food warehouses, confectionery plants and several types of food retailers.

That is moving even faster than we expected.

Better Plan Your Experience

WHEN both brickbats and praise come from all directions one can be pretty certain that he occupies a middle position which, as officials in Washington often aver, is the proper place to be. It's different when the missiles or compliments hit only from one direction.

Both criticism and compliments have been directed at "Food Industries" because caution and adequate technological background are advocated as indispensable for entry into successful food freezing. Since these comments come from several directions, it seems that we are in the middle of the road. But we shall maintain the position that a firm had better know what it is doing when it enters the frozen precooked food business. At least three firms of large size have been testing frozen precooked foods for more than two years and still refrain from going on the market because of the technological problems remaining to be solved.

In the face of the foregoing, we have been chided for directing too much attention to dangers—not enough to possibilities of success.

We are not trying to scare anybody from entering the field. But we are telling all and sundry that he who enters without adequate preparation and pretesting does so at considerable peril. Some 10 years or so ago, a chap in Virginia thought that blanching of vegetables prior to freezing was all poppycock. He froze 250,000 lb. of unblanched lima beans, which he finally was compelled to dump. His unsuccessful experiment cost about $30,000.

Large-scale experience is an excellent but costly teacher. We advocate small-scale, planned experience—which is but another name for research—before going ahead.

Millers Want New Designs

THOSE who believe present flour milling equipment designs are not adequate to meet F&DA standards of cleanliness outnumber those who are satisfied by two-to-one, according to a preliminary survey made by Allis-Chalmers. Also, the dissatisfied ones express their willingness to buy worthwhile improvements. All of this spells not only a prospect for improved sanitation but lower operating costs.

Another demand revealed by the survey indicates a desire to get away from line shafts in favor of individual motor drives. The purifier, it was generally agreed, needed improvement more than any other piece of milling equipment.

How many other branches of the food industry know what they want in equally explicit language?

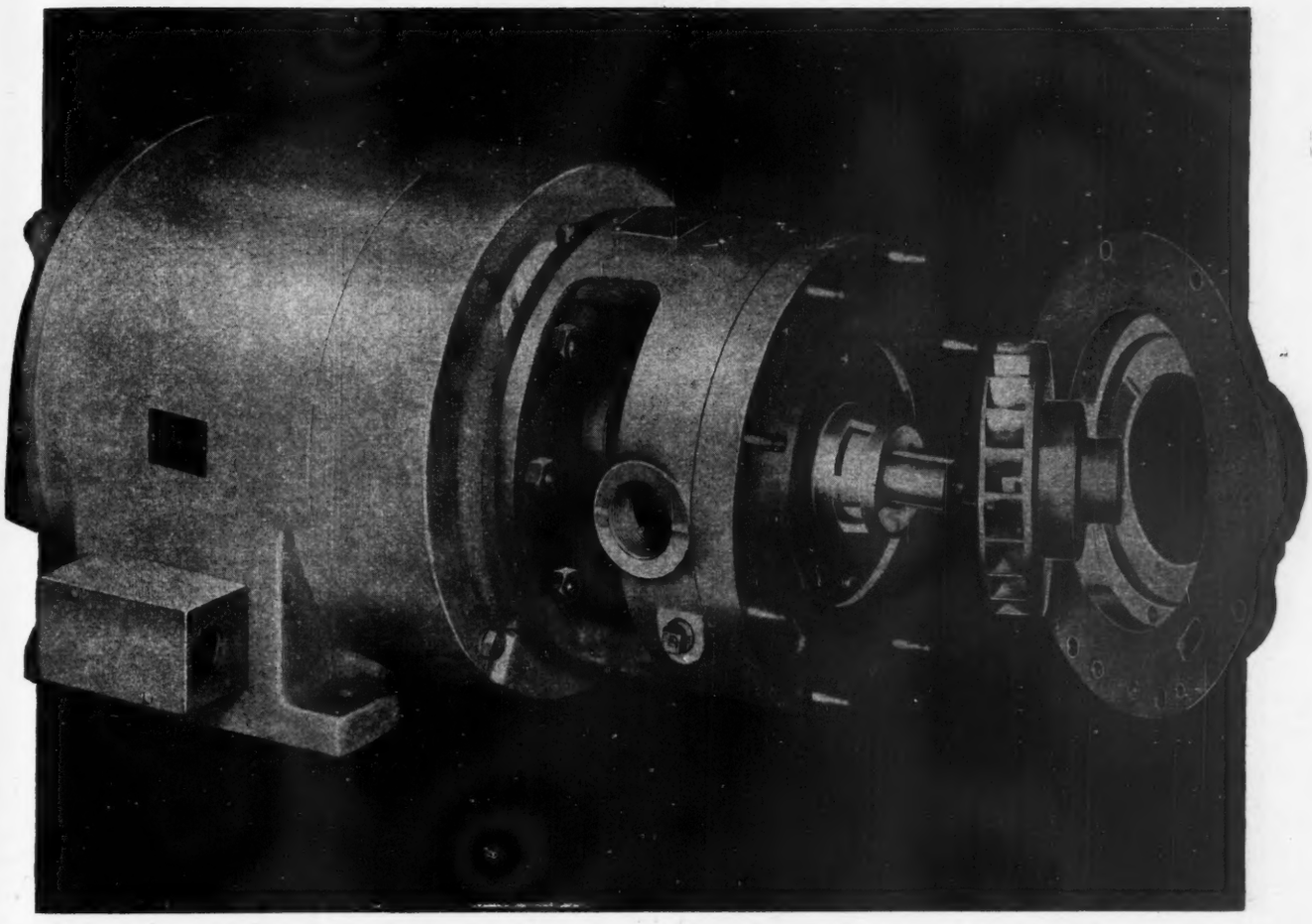
Fortify and Educate

CONTROVERSY, which seems wholly unjustified, occasionally breaks out over the question of adding vitamins to foods. Extremists on the two sides indulge in exaggeration, which is unfortunate because it neither encourages sound action nor does any good for proper understanding of vitamin technology. As usual in such an argument, both sides are right and both are wrong, in part.

Food technologists generally should encourage both the education of the public in getting vitamins from natural sources and the use of vitamins where needed for restoration of natural values or fortification of processed foods. In many cases, the hubbub about fortification discredits the practice of adding vitamins and mineral nutrients where they really belong. But it is equally unfortunate that some nutritionists make the absurd claim that, if the housewife provides the proper diet, there is no need for adding vitamins to any food. Both extremes of statement are wrong.

What we need in the vitamin campaign is a sane educational effort to encourage wise and diversified diet choices by the housewife. But we also need a conservative and proper policy of fortification so that modern processing, while providing excellence of flavor and perfect preservation, need not depreciate the nutrient characteristics of manufactured foods. In other words, let us both fortify *and* educate.

The Nash Clean-Air Compressor has but one simple moving part.



The Nash Clean-Air Compressor has but one moving part, cast in one piece and rotating in the pump casing without metallic contact. No internal lubrication is necessary; therefore air or other gas compressed with a Nash is entirely free from oil contamination.

Dust and heat are removed from the air, or gas compressed, by the unique Nash "Liquid Piston". Air from a Nash Compressor is therefore delivered free from dust, heat, or oil, without supplementary filters or air washers, in a perfected mechanical structure with no internal wearing parts.

Air or gas from a Nash Compressor may be used for agitating, blending, maintaining pressure on storage tanks, or moving liquids and materials by pressure displacement, in connection with the most delicate food, beverage, or chemical process, without danger of contamination.

Bulletin D-252 tells all about Nash Clean-Air Compressors, and it is free on request.

THE NASH ENGINEERING COMPANY

SOUTH NORWALK, CONNECTICUT, U. S. A.

NEW PACKAGES & PRODUCTS

Unpeels Itself

A SELF-PEELING casing, said to retain natural color and flavor of sausage meats, has been added to the ever-increasing list of packaging materials by The Goodyear Tire and Rubber Co., Akron, Ohio.

The casing consists of pliofilm, fabricated by the Naturalux Products Corp., Brooklyn, N. Y. It is made by tensilizing the material to get a circumferential rather than a longitudinal stretch.

Used by Karl Seiler and Sons, Philadelphia, sausage is stuffed into the casing and closed by tie strings at each end. Then it is dipped in a hot water bath which causes the tensilized pliofilm to tightly hug the meat. This step in the process is shown in an accompanying illustration.

The Naturalux company has found that this casing reduces loss of weight and retards spoilage and crusting.

The film unpeels as the sausage is sliced.

Gift Packages

AT A RECENT convention of the National Confectioners' Association, Pak-O-Gud Food Products Co., Philadelphia, displayed its two latest products that are being offered for the fall trade.

Bonnie Day Rum and Brandy Fruit Cake is packaged in a reusable transparent acetate container with tin bottom. Weinman Bros., Chicago, supplies the box. The pasted paper label is a red bow embossed in blue and gold.

The 2-lb. ring is protected by the paper in which it was baked, a cardboard stiffener for the bottom and a transparent wrap.

Ingredients include flour, sugar, eggs, shortening, leavening, spices, raisins, pecans, cherries, pineapple, lemon and orange peel, rum and brandy.

The second introduction, Bonnie Day Old Fashioned Fruit and Nut Squares, is suitable as a party tidbit or hostess gift.

The fruit and nut mixture is cut into squares the size of caramels and each one is individually placed in an accordion-pleated wax paper cup.

The squares consist of dates, figs, prunes, raisins, apricots, brazil nuts, corn sirup, sugar and cocoa butter.

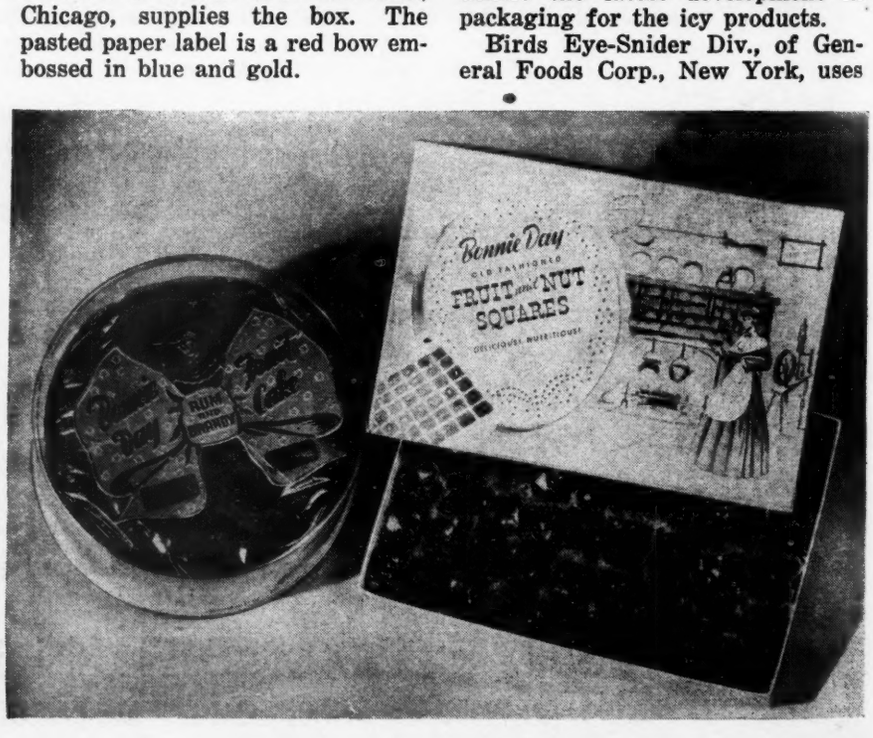
A standard size set-up box is used with an all-over pasted paper label done in red, yellow and blue. The outstanding design is a typical colonial Pennsylvania scene of a Quaker maid cooking over an open fire.

The product name and brand appear conveniently on all four sides as well as on the top of the container. Net weight is 1 lb.

Aluminum Foils Moisture

FIRST retail marketer of frozen foods is now one of the first to utilize the latest development in packaging for the icy products.

Birds Eye-Snider Div., of General Foods Corp., New York, uses

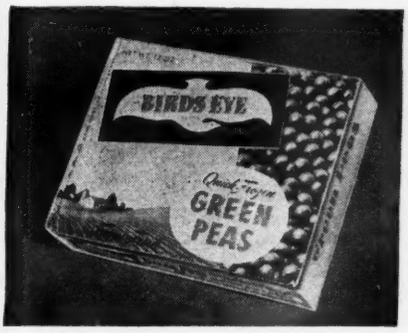


its new descriptive label on the aluminum pack recently introduced by Reynolds Metals Co., Richmond, Va.

Reynolds Pak is a material that has been welcomed into the frosted food field because of its labor-saving convenience and aid in maintaining high quality of product.

The Reynolds company says the aluminum wrap is a positive barrier to moisture vapor, is non-absorbent and cuts freezing time one-third to one-half. No liners or outer wraps are needed and it is air tight, leak proof and impervious to light and odors.

Birds Eye's new label depicts a farm scene in full color with a panel of life-sized peas.



Madrilene—Dehydrated

A COMPANY that is noted for its tin- and glass-packed poultry products has branched into the dry mix field.

Dorset Foods, Ltd., Long Island City, N. Y., is introducing Jellied Consomme Madrilene Mix under the Dorset De Luxe label.

The dehydrated mix with a tomato flavor is prepared by adding boiling water and chilling for about four hours. It also may be served hot or used as a base for molded salads.

A small flap-closed carton holds six air-tight aluminum foil envelopes. Packets contain two servings.

Two shades of blue are used for the basic color scheme with a crimson Dorset crest and white printing.

The closure is produced by the Dobeckmun Co., Cleveland.

Well-Wrapped Chips

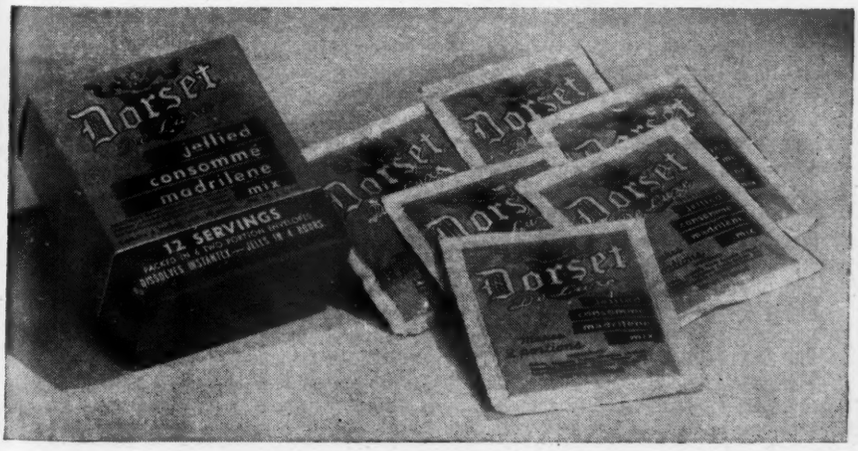
A PAPER mounted aluminum foil package, designed and produced by Milprint, Inc., Milwaukee, is used for the recently developed Scott's Super Tuber Potato Chips, product of Potato Products Corp., Chicago.

The container, sealed with wax, is said to be moisture proof, light proof and breakage proof. It is ideal for potato chips in that no special handling is required for long distance shipping.

Eye appeal is another feature of the package. Bright red, blue and white are used against a silver foil background. A Scottish lass does the Highland fling amid the boldly printed words.

The chips are made from spuds raised in the heart of the potato country of North Dakota and Minnesota.

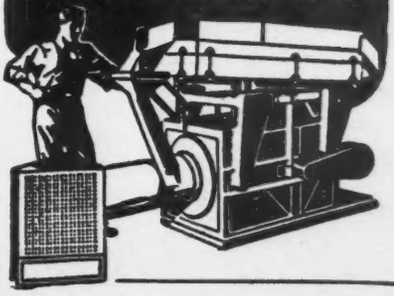
They are marketed nationally—5¼ oz. to the carton.



Stray Bronze

• Yes! And that piece of stray metal should not be found in your finished product! To eliminate this headache of the cereal and other dry food processors, we have developed a new type stoner better than 99% efficent! Revolutionary in design, it removes stones, glass, NON-MAGNETIC as well as magnetic metal, and other hard, dangerous contaminations from wheat, cereals, beans, and other dry food products with amazing ease. Compactly built, requires little floor space. CAPACITY UP TO 16 TONS PER HOUR! Operation cost as low as 3/5 of 1 H.P. per ton hour! Write for Bulletin FI-1046.

SS&S AIR-FLOAT STONER



SUTTON, STEELE & STEELE, INC.
DALLAS, TEXAS
In Canada—Kipp Kelly, Ltd., 68 Higgins Ave., Winnipeg
Foreign—Separations Engineering, Ltd. 133 Bush House, Aldwych, London

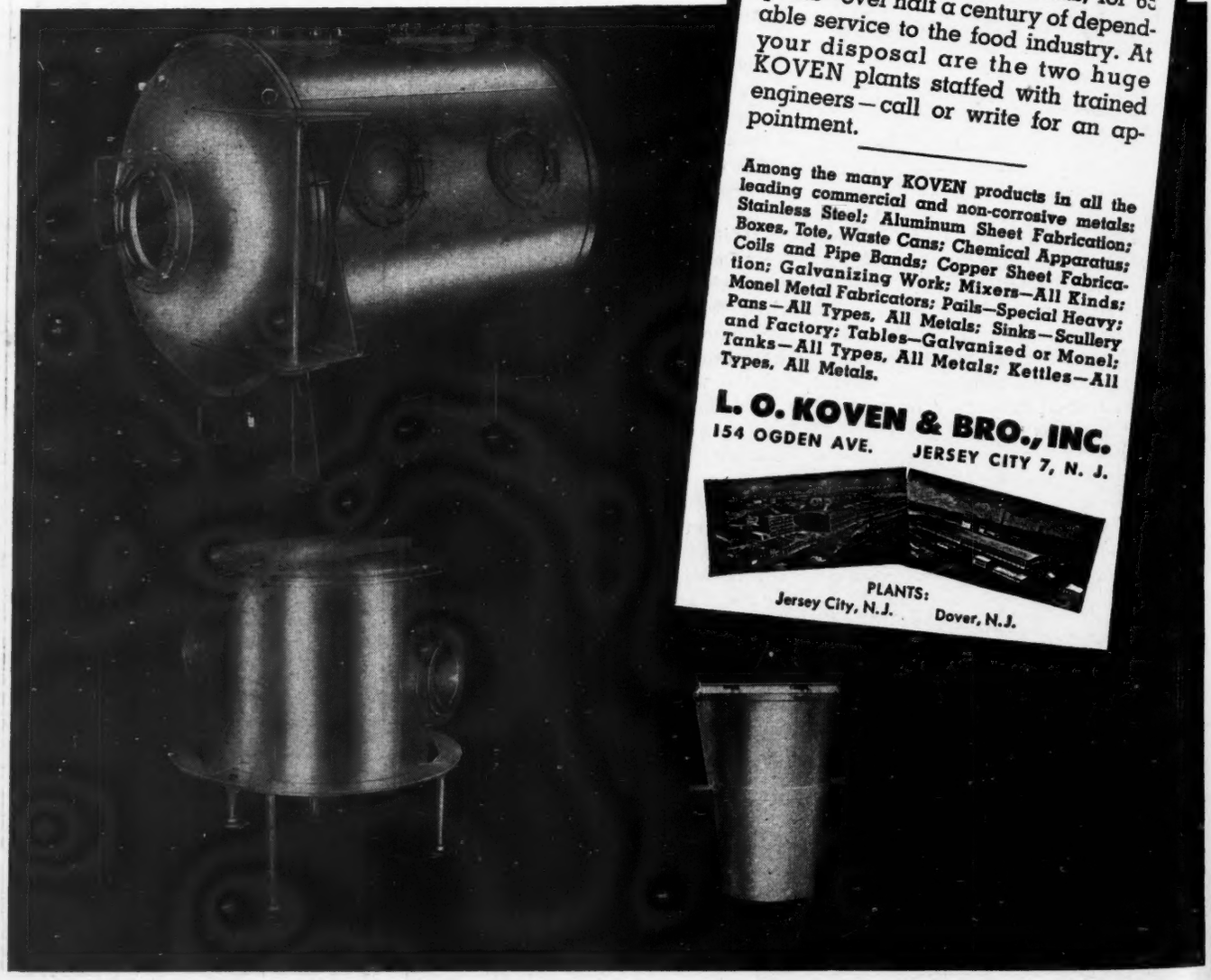
Like the STRADIVARI HALLMARK
On a Fine Violin

KOVEN

Has Been the HALLMARK *of* SUPERIOR

INDIVIDUALIZED FOOD EQUIPMENT

Since 1881



Into the making of each Stradivarius violin, the great craftsman put his quality workmanship. In food equipment too — KOVEN equipment — the mark of quality workmanship is to be found.

KOVEN has been designing reliable, economical food equipment, built to meet individual requirements, for 65 years—over half a century of dependable service to the food industry. At your disposal are the two huge KOVEN plants staffed with trained engineers — call or write for an appointment.

Among the many KOVEN products in all the leading commercial and non-corrosive metals: Stainless Steel; Aluminum Sheet Fabrication; Boxes, Tote, Waste Cans; Chemical Apparatus; Coils and Pipe Bands; Copper Sheet Fabrication; Galvanizing Work; Mixers—All Kinds; Monel Metal Fabricators; Pails—Special Heavy; Pans—All Types, All Metals; Sinks—Scullery and Factory; Tables—Galvanized or Monel; Tanks—All Types, All Metals; Kettles—All Types, All Metals.

L. O. KOVEN & BRO., INC.
154 OGDEN AVE. JERSEY CITY 7, N. J.

PLANTS:
Jersey City, N.J. Dover, N.J.

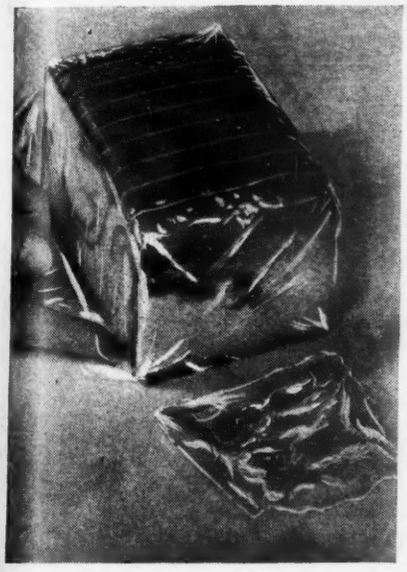
Strings Attached

THE NiceSlice wrapper is a recent development of interest to manufacturers of baked goods, cheese and other loaf products that have to be sliced.

A string slicer is incorporated in the package—rendering a knife practically superfluous.

This is how it works. The housewife first uses a thread as a "rip cord" to open end of package. Thread for desired slice thickness is picked from extended edge of wrapper. The consumer pulls the thread toward her, peeling it from inner surface of wrapper and, at the same time, cutting the cake.

The wrapper is not mutilated by this operation because the thread

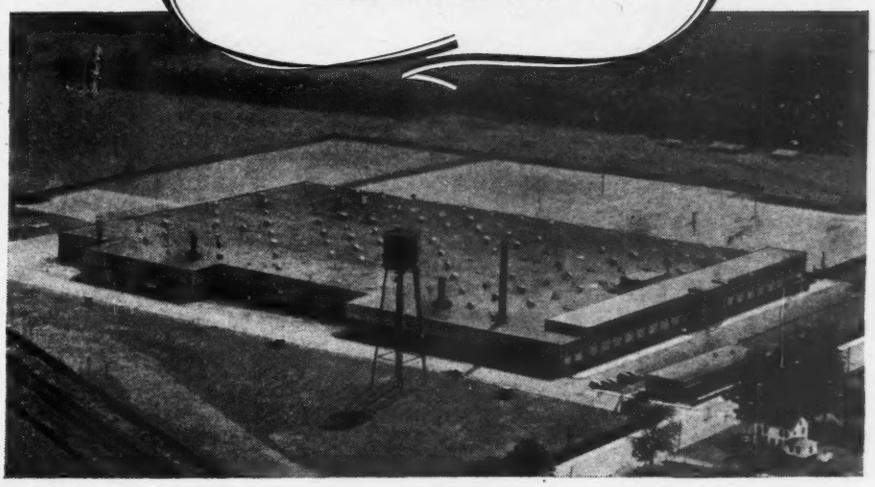


cuts product only. After slice is removed, end portion of wrapper can be replaced, helping to preserve freshness of the contents.

NiceSlice wrapper has been found suitable for ice cream, fruit cake, liver sausage, meat loaf, butter, candy, yeast and soft soap as well as cheese and pound cake.

Patent for this device is held by Bruce K. Slonneger, president of The Bruce Slonneger Products Co., Washington, Ill.

SOLVING OUR CUSTOMERS' PROBLEMS
BUILT OUR BUSINESS



New Plant of the Package Machinery Company

361,000 square feet of floor space—40 acres of land

This new plant at East Longmeadow, just outside the city of Springfield, when in full operation, will enable us to greatly increase our output of wrapping machines.

Production will continue in our present plant while the machines and equipment are being installed in the new plant.

Our offices will be located on the first floor of the front section. The Engineering Department will occupy the entire upper floor.

With manufacturing operations all on one vast floor, efficiency will be greatly increased, and working conditions will be more pleasant for our craftsmen. All of which will result in still better service for our customers.

We deeply appreciate the fact that our steady growth over the past 33 years is due to the confidence placed in us by the packaging industry. And you can be sure that we will continue to do everything possible to retain that goodwill by endeavoring to make our services of increasing value.

PACKAGE MACHINERY COMPANY
Springfield 7, Massachusetts

30 Church St., New York 7 • 111 W. Washington St., Chicago 2
101 W. Prospect Ave., Cleveland 15 • 849 Marietta St., N. W., Atlanta 3
443 S. San Pedro St., Los Angeles 13 • 320 Market St., San Francisco 11
18 Dickens Ave., Toronto 8

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

EXTRA YARDAGE WITH THE WIND!

Vitamin enrichment can add sales yardage to your product

In golf, the wind at your back adds yards to your drive. In marketing food products you will have the wind of consumer acceptance with you when you enrich with vitamins.

In a recent survey*, 77.4% of the American housewives questioned emphasized that they prefer foods which have been enriched with vitamins; 99% stated that they consider vitamins of great importance in the food they serve their families.

Your best bet: Study the possibilities of improving your product through enrichment with 'ROCHE' vitamins.

*Fawcett Women's Group

Vitamin Division

ROCHE

HOFFMANN-LA ROCHE, INC.
Roche Park, Nutley 10, New Jersey

FOOD INDUSTRY NEWS

GENERAL

Law Directs Marketing Study On All Agricultural Products

Flannagan-Hope Act specifies that USDA shall assist producers to fully utilize and efficiently distribute output

VISION is being forced on the Department of Agriculture. The vehicle is the Flannagan-Hope Act, Public Law 733, which will broaden research activities of the department to include not only production, but also utilization and distribution of agricultural products.

Congress has determined that, the USDA must seek new ways of handling agricultural surpluses it has helped to create by finding new uses and by expanding markets through lower distribution costs.

Under the Flannagan-Hope Act the various agencies of government are instructed to work with the various parts of the private marketing system by helping the private system to find answers to its problems. The government agencies also are directed to render necessary services to the end that the private marketing system may be made to function so efficiently that there will be no demand to replace the private system with government distribution.

The new law is written in two parts. Title I covers production research and sets up a formula for spending the funds Congress may appropriate for the purpose. It is specified that 20 percent must be spent for marketing research. The Bankhead-Jones Act of 1935 provides for production and or marketing research. Ever since its enactment research workers, for the most part in State institutions, have been busy on production problems to the exclusion of work on marketing and utilization. Hence the 20 percent figure for marketing was included.

Passage of the bill was marked by complete unanimity in both chambers. There were no votes against the bill either in the House or in the Senate or again in the House on concurrence with the changes made by the Senate.

Only fireworks came when the Farm Bureau endeavored to secure an amendment in the Senate committee which would have told the various organizations, state and federal, just who would do what. It was an unworkable scheme because of the lack of uniformity of the state organizations. The Farm Bureau was trying to put the control of marketing research into the hands of the State Universities which the bureau feels it controls. This amendment was made innocuous when the Senate was considering the legislation.

In the official summary of the act, it is explained that "Title I broadens the Bankhead-Jones Act of 1935 and provides for payments to the states for additional research on all types of farm problems, particularly those of recent origin and any that may develop later. Permitted fields of research include improved methods of production, problems of human nutrition, discovery of new and useful crops, expanded uses for farm products, conservation and development of land, forest and water resources for agricultural purposes."

Wide World

EARLY TURKEYS

The earliest turkey crop in 11 years is predicted by the Department of Agriculture, with 25 percent heading for market by November 1. The national total is estimated at slightly more than 41,000,000 head, 9 percent less than last year. This picture was taken on an Indiana farm.

Title II "provides funds and authority to expand research and service in the marketing, transportation and distribution of agricultural commodities."

Title II forces the USDA into investigations leading to greater utilization of farm products by cutting the spread between what the farmer gets and what the consumer has to pay. It forces the department to consider other ways of handling surpluses than production control or outright purchase.

While this has been called a bill to squeeze the middleman, sponsors believe that it will merely squeeze out inefficient operations common in the present system, which should in the long run make the present system healthier and more profitable. It would insure that independent distributors would use the same practices that makes the chain store a more efficient operation.

Preliminary plans for investigations under Title II include work on the distribution of processed foods as well as fresh fruits and vegetables. In the early stages emphasis may be expected on the marketing of frozen foods. Studies are already planned to determine what food products, under what conditions, in what kind and size package, etc., can be moved by plane.

The ink was hardly dry on the President's signature before the battle lines within the department were drawn in the struggle for control of the expanded research program. As it is now set up the USDA is not interested in marketing except for the buying and selling which the department itself carries on. This is quite different from market services and research, which would assist in the distribution of food to the public.

A great deal depends upon how the department revises its organization to handle the new work. The Secretary is authorized, but not specifically directed, to establish a single agency to carry out the will of Congress as expressed in the bill. If an agency is not properly set up, Congressional leaders who vigorously supported the legislation will fight just as hard to see that the necessary funds are withheld.

Analysis Shows CIO and AFL Positions on Four Critical Issues

AN analysis of the future trend of labor union activity, drawn from recent CIO and AFL meetings, has been made by the McGraw-Hill Washington Bureau. The highlights of this analysis, presented here, indicate the positions of these two major organizations on four of the most critical issues now facing American industry.

1. A Second Labor-Management Conference

CIO—Since July 18, when it was first proposed, the need has increased for President Truman to call a conference of labor and management, "to the end that the demand and need for immediate wage increases may be given full and official recognition and to the end that the crisis created by the drive to cripple and destroy price control may be met quickly through adequate guarantees for a stabilized national economy." "A joint conference to curb rising prices and to protect the wages and living standards of the American people is imperative if the crisis which now threatens to engulf the nation is to be solved." Government must play a greater part in this conference than it did in the one held last November.

AFL—"We doubt the wisdom of such action. It would not be productive of good results. We prefer to work out agreements with employers through collective bargaining, free from government intervention and control."

Comment—The AFL deals mostly with small employers, many of whom don't come under price ceilings or who can absorb wage increases. It was able, without strikes, to negotiate many increases under the wage-price policy existing before the end of the steel strike in mid-February. It blames the CIO for fracturing the wage-price policy, thru what it calls political industry-wide strikes, and for the precipitate rise in cost of living that followed the revised policy necessitated by settlement of the steel strike. Inherently opposed to government interference in labor relations, the AFL doesn't like CIO's repeated reliance on government assistance. It will be recalled that the AFL (and its then returning prodigal son, John Lewis) joined industry spokesmen in resisting CIO efforts to have the last labor-management conference fix a postwar wage pattern.

2. Price Control

CIO—The Feb. 14 wage-price policy has been administered tightly as to wages and, to appease Congress in hopes of getting OPA extension beyond June 30, very loosely as to prices. Decontrol was put into high gear. Result: The BLS Consumers' Price Index, which had risen 2 percent in the year preceding last February, jumped 3 percent between February and June, and 5½ percent between mid-June and mid-July. Program of action: (a) Increased consumer resistance to rising prices through buyers' strikes; (b) demand most rigorous price control policy permissible under the new law; (c) restoration of subsidies until April 1, 1947, as allowed by law; (d) advise Truman as to monetary and fiscal policy recommendations he should make to Congress, as requested by law. "It is not open to doubt that if the Congress is prepared, by a firm policy of taxing speculative profits, to remove the incentives that exist for the hoarding of goods and the manipulation of prices, inflation can and will be substantially checked."

AFL—Took no action on this subject.

3. Wage Stabilization

CIO—"Labor cannot continue to participate in a stabilization program, in which wages are rolled back, while at the same time increases in cost of living become a daily occurrence. A stabilization program, which means curbs on wage increases and soaring price increases, is not a stabilization program but a fraud. If wage stabilization is to continue, it must be revised to take account of the vast increase in prices and the increase in the cost of living that have occurred during the past six months. It must be made responsive to the runaway prices that now confront us. . . . Labor's acceptance of any form of wage stabilization is possible only if there is an immediate rollback of food prices and an administration of the present PRICE CONTROL ACT, which will produce a maximum control of all prices."

AFL—The executive council did not discuss this subject, but AFL views were presented to the Price Decontrol Board. AFL is for restraint in wage demands, elimination of shortages and believes full production is possible with effective price control.

Comment—We are in a watchful waiting period on the part of organized labor. Ground work is being laid for wage demands after elections on the basis of increased living costs. Ostensibly, union leaders are waiting to see if prices and the cost of living are rolled back to pre-June 30 levels, but they know there isn't a chance of it. The next few months will serve to determine what the size of the wage demand will be. UAW-CIO's filing a 60-day wage reopening notice with Chrysler, on Aug. 20, and the announcement of Walter Reuther that contracts will be reopened wherever permissible, has been declared by Reuther to be consistent with the CIO policy. Chrysler workers fixed the basis for the reopening on "drastic wage cuts which rising prices have imposed" on them.

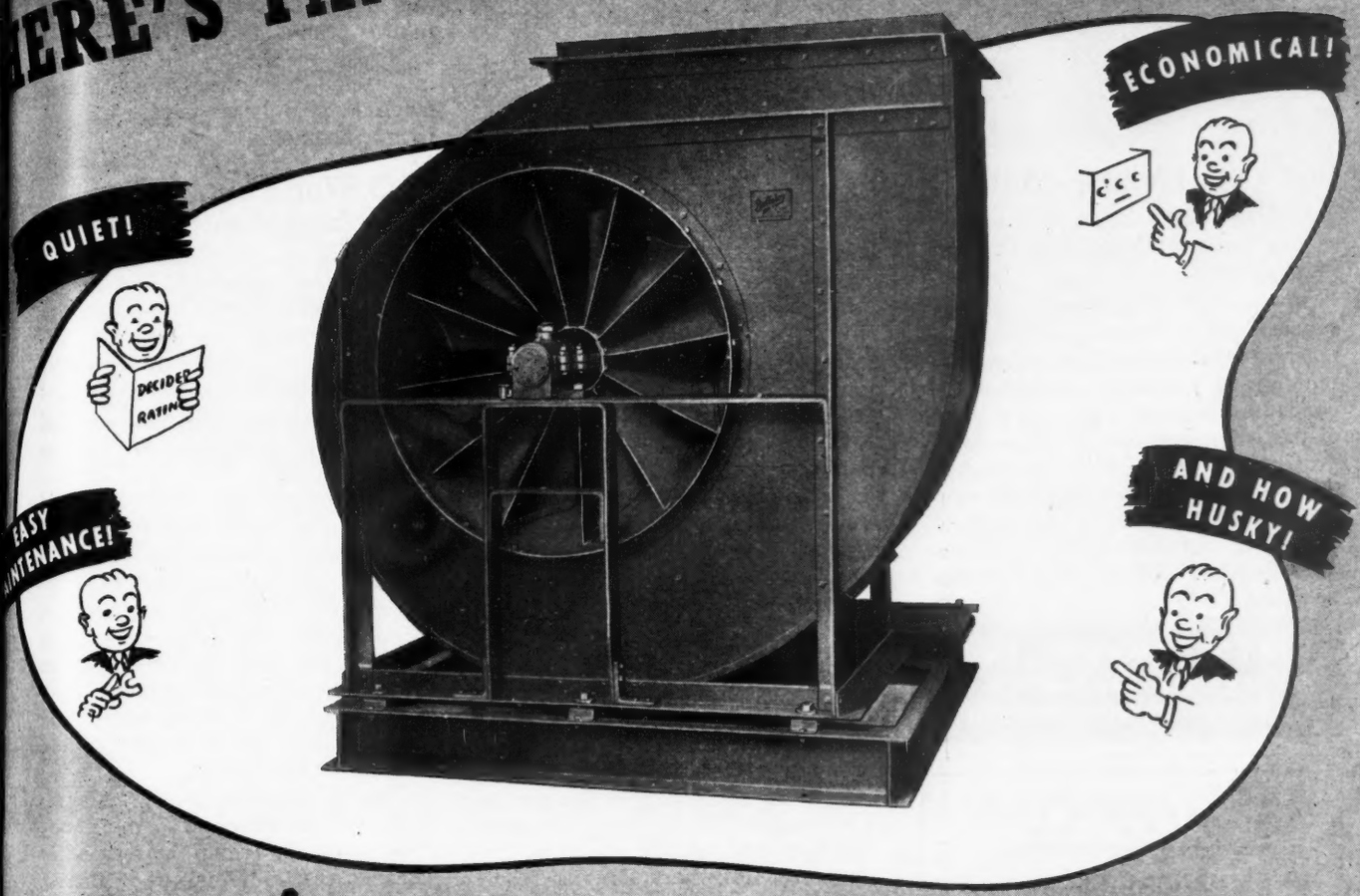
4. Production

CIO—American industry is raising the cry of "production" in effort to multiply profits and conceal fact that existing shortages are a result of quest for higher profits. Employer groups falsely accuse workers of "not producing adequately" and seek additional profits by attacking wage and living standards through the speed-up and other devices. "The CIO repudiates any suggestion that the answer to our economic ills lies in the speed-up or in the widespread deterioration of terms and conditions of employment for which many employers in America are increasingly responsible." Speedup and low wages have brought two depressions in 25 years. "Only a sustained purchasing power and a high wage economy accompanied by a prompt curb on the increasing inflationary tendencies which now confront us can avert swift economic tragedy."

AFL—"Our major need is volume of production. Our safety lies in getting through this period of transition with no major increases in costs or stoppages of production. Wage earners can best stabilize their wage dollars by helping to increase volume of production which can wipe out scarcities and the danger of run-away inflation." "Traditionally, America has paid for rising wages by increasing productivity, and this is the only way to raise living standards. The other alternative—to pay for wage increases by raising prices—is no gain at all for workers, because living cost increases cancel wage gains. We must begin at once to increase productivity so the next wage increases can be paid without raising living costs."

Comment—Union leaders know that the next wage increases will have to come out of increased productivity if they are to have any real value, but the CIO, it will be noted, refuses to face the issue as squarely as does the AFL. The CIO is still preaching that more wages can come out of profits. The next issue of its Economic Outlook will be devoted to the subject of profits. Walter Reuther, who staked his future as a union leader in the General Motors strike on the principle that wage increases can be paid without price increases, is now talking production and is concerned about its effect on pay envelopes. But he's only thinking of maximum production as it relates to full employment, rather than in terms of increased productivity that could raise wages without price increases. He says: "There can be no real prosperity for America unless the entire community is rallied behind a campaign for higher wages, lower prices, and maximum production. There is no other road to full employment and full production."

HERE'S FAN PERFORMANCE FOR YOU



"Buffalo"

LIMIT-LOAD FANS

ot only the plant operating groups concerned . . . but your employees benefit by the trouble-free, efficient ntilation of "Buffalo" Limit-Load Fans. Proper air rculation ranks high as an aid to bodily health and comrt . . . as well as to higher production.

xed inlet vanes in these "Buffalo" Fans cut down turbunce, giving exceptionally quiet operation. High elivery at low rotor speeds (due to wide, deep, curved lades) gives you lower power costs. Husky construcon throughout means minimum maintenance. And the on-overloading characteristic prevents motor burnout. may well pay you to investigate fan performance like this. Your "Buffalo" representative will be glad to give you the facts!

BUFFALO FORGE COMPANY

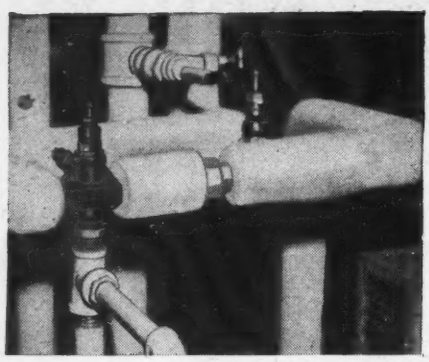
152 Mortimer Street — Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

You'll find all performance data on "Buffalo" Type "LL" Fans in Bulletin 3339. Write for it!

"Buffalo" first for fans

FANS FOR EVERY JOB



LOW COST COOLING CONTROLS

Few devices cost so little and save so much—because the Sarco TR-40 saves in many ways.

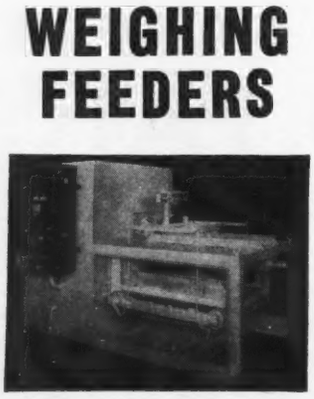
It saves water and increases engine efficiency by maintaining correct jacket temperatures. It saves lubricating oil—prolongs the life of the equipment. On condensers and stills it saves up to 50% of the water and insures dependable process operations. It boosts production on degreasers and other tank control processes. Sizes ⅜ to 1½ inch. Calibrated for any temperature between 40 and 200 degrees F. Bulletin 700. 198

SARCO COMPANY, INC.
475 Fifth Avenue, New York 17, N. Y.
SARCO CANADA LTD. 85 Richmond St. W., TORONTO 1, ONT.

SYNTRON

"Weigh-Flow"

WEIGHING FEEDERS



FOR DRY FEEDING BY WEIGHT

Provide a positive, accurate and automatic "Weigh-Flow" of material.

Eliminate all guess work—and feed exactly the right amount—by weight.

Write for catalog data.

SYNTRON CO.
460 Lexington, Homer City, Pa.

Siebel Succeeds Adams As Dehydrators' Head

GEORGE E. SIEBEL, president, Little & Co., Chicago, on August 24 was elected president of the National Dehydrators Association, succeeding Graham Adams who resigned as of Oct. 1. Charles Watson, 3rd, has also resigned as Chairman of the Board, as well as from the executive committee and as a director of the association. William A. Friend, Sokol & Co., Chicago, and Thomas R. Metzger, Michigan Processed Foods, Inc., Greenville, Michigan, have been elected directors. The newly elected executive committee is composed of the following members: F. Webster Browne, H. C. Baxter & Bro., Brunswick, Me., George E. Clausen, president of Gentry, Inc., Los Angeles, Calif. and President Siebel.

It was decided to hold the next annual meeting in Chicago a few days prior to the National Canners' convention, in Atlantic City, scheduled to open January 19. Members will thus be enabled to attend both meetings.

Ceiling Prices Off Some Food Machinery

PRICE control over specified food products machinery was suspended by OPA, effective September 18. The suspension covers equipment designed and sold for the industrial processing of the following foods:

Baking powder, cocoa, chocolate, coffee, flavoring, extracts, spices, tea, confectionery products, such as candy, chewing gum and flavored drops, macaroni, spaghetti, ravioli, nuts, popcorn, potato chips, salt, sugar and sugar products, including molasses and syrup. The processes include working, hulling, shelling, roasting, pressing, grinding, mixing, extracting and refining, but not farm machinery used in the producing or processing of foods for market. Machinery used in packaging, wrapping, filling, labeling, sealing or cartoning also is not included.

FAO World Summaries Important to Industry

EXTENSIVE international movement of food raw materials and manufactured foods gives new significance to world trade data. This is currently recognized by a number of agencies of which the latest and perhaps most important is Food and Agriculture Organization of the United Nations.

FAO has recently released one of its first elaborate world-wide statistical summaries of importance to the food industries. This particular report "Technical Supplement No. 7" deals with fertilizers. But it shows the very complete way in which this international body is going to study production, trade, and consumption for each individual nation of consequence.

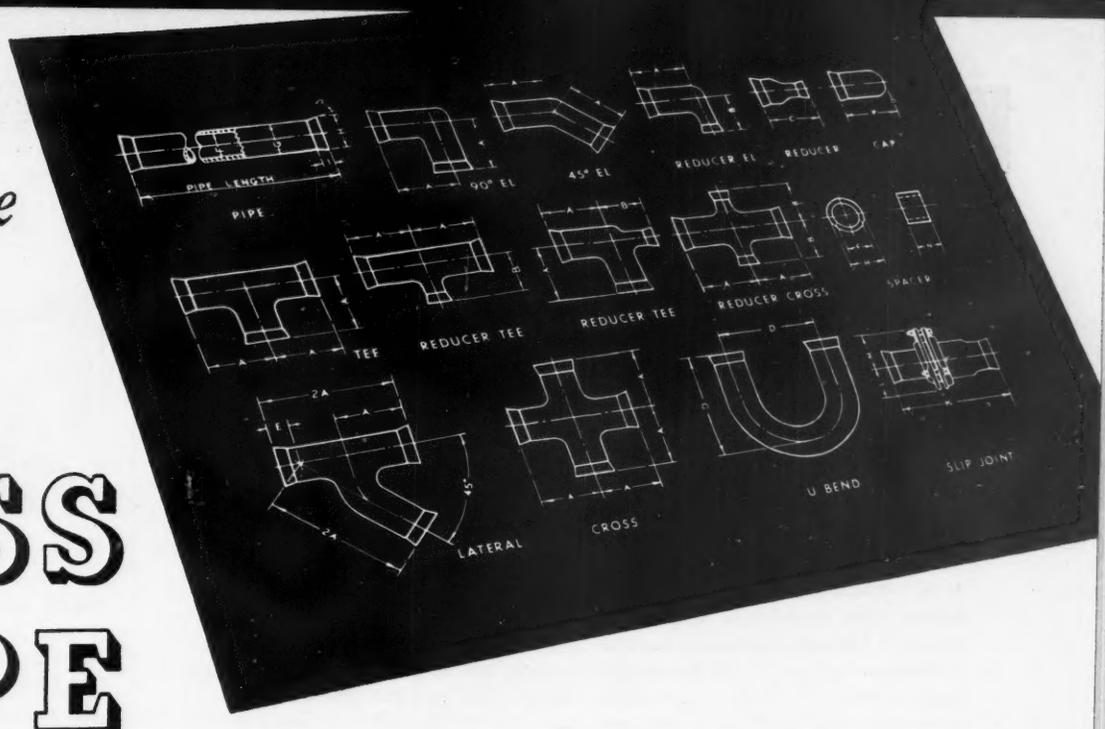
Continuing are the current reports of International Emergency Food Council, which has recently replaced the Combined Food Board. During September the Council released its estimates on both production and consumption requirements of various food materials. Its sum-

Wide World

RICE HARVEST

Louisiana appears to be a nice place to be during the rice harvest. These southern belles are at least supposed to be helping to stack the bundles. There is also a mystery attached—the original caption names five girls, from left to right.

A Complete Line of Standard Fittings for GLASS PIPE



here is a complete line of Pyrex brand Glass Pipe Fittings meet the requirements of any installation. These Standrd fittings are available in 1", 1½", 2", 3" and 4". Special tings can be made to order.

Consequently it is easy to install this practical, ecomical pipe. Once installed you will cash in on its unique mbination of qualities.

Its resistance to thermal shock permits cleaning by flushing with steam or hot water immediately followed with cold rinse water. Its chemical stability, visibility and purity maintenance contribute to its long, trouble-free service. Its transparency enables you to visually inspect every inch of the pipe and its contents.

Miles of Pyrex Pipe that have been in actual plant service for many years are your best assurance that you can install it with complete confidence in its performance.

MPORTANT FEATURES OF PYREX BRAND GLASS PIPE

IBILITY. The crystal clear transparency of PYREX Pipe permits visual pection of every foot of your pipe line at any time. This feature serves forwarn you of unexpected trouble in your pipe lines.

AINTAINING PRODUCT PURITY. PYREX Pipe is resistant to all acids xcept H.F.) and moderate alkalis. There is no heavy metal pick-up or nger of metallic contamination. PYREX Pipe lines assure the ultimate obtaining product purity.

SE OF INSTALLATION. Your own men can install a PYREX Glass pe Line. No special tools or special training are required. The pipe, the tings and the hardware come to your installation point ready for sembly. Stock adaptor flanges are available to connect PYREX Pipe metal pipe and other plant equipment.

ZES AND FITTINGS. PYREX Glass Pipe is now available in 1", 1½", , 3" and 4". A complete line of standard PYREX fittings includes ells, s, return bends, laterals and reducers. Special fittings can be readily ade to your specifications.

Standard fittings and adaptor connections are available to connect PYREX Pipe to your present equipment.

LOW COST. The initial cost of PYREX Pipe (accessories included) is about the same or less than the cost of full weight copper or brass piping in comparable sizes, and is considerably less than the cost of most other corrosion resistant alloys. Whether you figure costs of new equipment in terms of initial outlay or in terms of over-all costs—spread over the length of service it will give you—PYREX Pipe is your best bet.

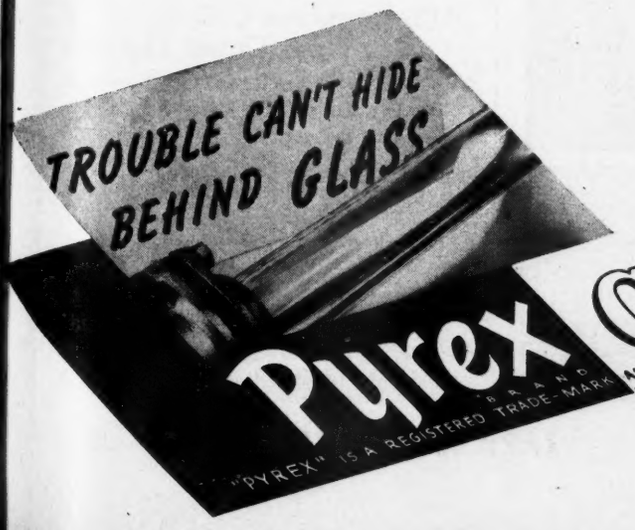
OPERATING PRESSURES AND TEMPERATURES. Operating temperatures as high as 250°F. are not unusual—and temperatures as high as 400°F. can be considered. Most installations operate at pressures up to 50 p. s. i. —but pressures as high as 100 p. s. i. can be considered.

Corning Engineers will gladly furnish complete details. Write to Industrial Sales Dept. F.I.-10

CORNING GLASS WORKS

CORNING, NEW YORK

SALES OFFICES IN NEW YORK, CHICAGO AND SAN FRANCISCO



GLASS PIPE

AND INDICATES MANUFACTURE BY CORNING GLASS WORKS, CORNING, NEW YORK

INDUSTRIAL SALES DEPT., F.I.-10
Corning Glass Works, Corning, New York

Please send me IA-2 "PYREX PIPE" for the Food Industry

Name..... Title.....

Firm.....

Address.....

TIDEWATER
RED CYPRESS
Is the Answer to Any Problem of DECAY, ODOR, TASTE or ACID!

...Its Superior Qualities Make It Ideal for a Wide Range of Industrial Uses

The Indians knew it, the Spaniards knew it, the French knew it, and those of English decent of the Southeastern regions have known for 150 years the superior qualities of Tidewater Red Cypress and its resistance to decay. Along the Atlantic Coastal Plain where lie buried cypress trees that grew over 100,000 years ago in the Pleistocene Age, many of which have since been dug up, give mute evidence of the lasting qualities of cypress never equalled for its decay resistance. In more recent years industry has also learned that it licks the difficulties of odor, taste and acid. Tidewater Red Cypress has ALL the qualities you demand for many specific industrial demands.

SCMA **Tidewater** RED CYPRESS — Tidewater Red Cypress "The Wood Eternal"

CAN BE FURNISHED FROM ST. LOUIS STOCKS

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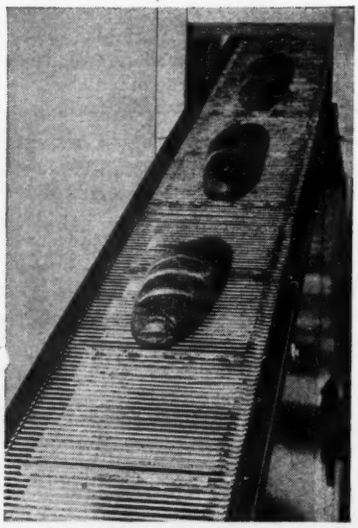
The right belt is more efficient . . .
CYCLONE OFFERS THREE TYPES!

You get *unbiased* recommendations when you consult Cyclone about metal conveyor belts because Cyclone makes *three* types (Flex-Grid, Chain Link and Flat Wire) in a variety of metals, alloys and finishes. Such a wide selection assures you of the belt best suited to *your* particular operating conditions. Cyclone has been making metal conveyor belts for over 25 years and a wealth of technical knowledge is at your disposal The Cyclone reputation is you guarantee of satisfaction. Office. in principal cities . . . factories in Middle West and on Pacific Coast. Write for *free* catalog No. 3.



Cyclone Flex-Grid is light, extremely flexible, easy to clean, and can be equipped with risers, if desired.

CYCLONE FENCE DIVISION · American Steel & Wire Co. · USS CYCLONE METAL BELTS · UNITED STATES STEEL

Made by the makers of Cyclone Fence
CYCLONE FENCE DIVISION
(AMERICAN STEEL & WIRE COMPANY)
Dept. H-106, Waukegan, Illinois
United States Steel Export Company, New York

UNITED STATES STEEL

mary of canned fish available for world allocation was particularly significant as bringing out the fact that two-thirds of the available supply represents canned fish produced in United States establishments. I.E.F.C. recommends that approximately 50 percent of the world supply, considered by it, remain for U. S. consumption. In addition the United States and Canada are each expected to supply for export about 150,000,000 lb. of canned fish. The largest recipient will be the United Kingdom, followed by UNRRA (taking 20 percent) and then the various shortage areas like Belgium and France.

Office of Foreign Agriculture, in the U. S. Department of Agriculture, is also summarizing the world food situation currently in a series of reports entitled "World Food Prospects For 1946-47". That series and other publications of the department present currently, for the guidance of American enterprise and agriculture, the latest available statistical picture of food movement and food requirements. American food processors are compelled to face the fact that these factors now often determine domestic processing plans and limitations.

AFL Reverses CIO in West Coast Election

THE AFL Teamsters' union won a plurality in a Northern California "big plants" cannery workers election held by the NLRB early in September, (Food Industries, August, 1946, p. 146) and the CIO Food, Tobacco and Agricultural Workers union promptly announced it would challenge validity of the vote.

The election reversed a setaside ballot of the some 55,000 cannery workers employed in 61 California

To avoid damage from Oxidation . . .

protect with NITROGEN

LINDE Nitrogen provides an ideal means of protection against oxidation and corrosion by air. For packaging dehydrated foods; for deaerating, processing, storing and packaging fats and oils of all kinds; or for providing an inert atmosphere, free of impurities, for the complete protection of practically any material susceptible to oxidation, use LINDE Nitrogen.

LINDE Nitrogen is 99.7% pure, but is also available bone dry and at higher purity for special applications. It is supplied as a compressed gas in cylinders containing 224 cu. ft. each, or in bulk in tank-truck and tank-car lots as a liquid which is converted into gaseous nitrogen as required. LINDE Nitrogen in bulk offers remarkable savings in cost and eliminates cylinder handling.

Write or call the Linde office nearest you.

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Kansas City, Mo.
Tulsa, Okla.

Western States
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Los Angeles, Calif.
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Linde HYDROGEN · NITROGEN · OXYGEN
ARGON · HELIUM · KRYPTON · NEON
XENON — Prest-O-Lite ACETYLENE

The large sugar syrup tank illustrated below is 7 feet in diameter and 29 feet long, with an approximate capacity of 8,000 gallons. This steel tank was coated on the inside with Amercoat #23 white and on the exterior with Amercoat #33 gray. Amercoat was chosen because it is:

Non-toxic, has no taste transfer.

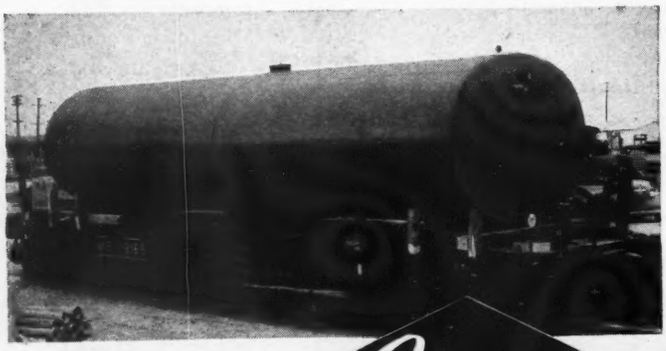
Completely resistant to practically every corrosive action encountered in the food industry.

Unaffected by caustic sterilizing agents, and is the equal of glass in its resistance to harboring bacteria, mold and fungi.

Easy to apply by brush or spray—dry to touch in 30 minutes.

Applied to concrete, wood or steel—economical—long lasting—minimizes plant shut downs.

Eight years' use by the food and dairy industries has proved AMERCOAT superiority. Write for names of users and details.



IN THE FOOD INDUSTRY, IT'S

Amercoat

PLASTIC COATINGS

Ask for Booklet 3-D

AMERCOAT DIVISION:
AMERICAN PIPE & CONSTRUCTION CO.
P.O. Box 3428, Terminal Annex, Los Angeles 54, California

Processors and Growers canneries, taken last October, in which the CIO won a plurality and claimed a majority.

A first counting of 33,000 votes showed the AFL plurality to be 680 votes short of a majority, an unofficial tally listing: AFL, 16,269; CIO, 14,896; non union, 674; challenged, 2,156; voided, 382. Since most of the challenges of the deciding votes are CIO, it is assumed that AFL will make its majority.

Donald Henderson, FTA president, said the union protest will be based on "documented evidence of illegal actions" by cannery management and AFL teamsters' union representatives. He said he would ask the NLRB to certify a bargaining agent until the FTA protest has been filed and acted upon.

New Office

THE insular government of Puerto Rico has opened offices in Washington to facilitate doing business not only with the government of the United States, but also with American industry interested in any feature of Puerto Rican activity. Food producers, having business with the Territory, should write to Office of Puerto Rico, 1026-17th Street, N.W., Washington 6, D. C.

DISTRIBUTION

U. S. Joins Britain In Packaging Studies

CONSOLIDATION of research facilities between two leading professional associations in Great Britain and the United States was announced today when directors of the Packaging Institute voted approval of an exchange of technical research data with the Printing and Allied Trades Research Association, London.

"PATRA", as the British group is abbreviated, through its packaging division, maintains laboratories and library facilities to advance Britain's technical studies in all phases of metal, paper, glass, and synthetic materials. A recent grant of the British government will soon see this facility expanded. British packaging technical studies have been much admired by American readers since their resumption after V-J Day.

The Packaging Institute, comprising approximately 400 American and Canadian firms manufacturing packaging materials and machinery, including a large number of leading package users in the

At the touch of a button...

THE new Solenoid High Vacuum Valve—a D.P.I. product . . . offers instant control over your high vacuum systems.

The Solenoid *High Vacuum* Valve represents a long step toward complete, fully automatic control of manufacturing processes involving high vacuum. In the production of refrigerating units . . . wherever trolley exhaust systems or rotary machines are used . . . investigation of the unique advantages offered by these new valves may pay substantial dividends.

How much time Solenoid *High Vacuum* Valves will save . . . how much closer they can bring practical performance to theoretical rating . . . these are questions answerable only in terms of the individual installation.

DP INC.

For further information on Solenoid High Vacuum Valves or other D.P.I. products, write—

Vacuum Equipment Division

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LIQUIDOMETER
Tank Gauges

"LIQUIDS WORTH STORING ARE WORTH MEASURING"

THE LIQUIDOMETER CORP.
38-14 SKILLMAN AVE., LONG ISLAND CITY, N.Y.

ROBINSON
PROCESSING UNIQUE EQUIPMENT

ATTRITION MILLS

IMPROVED TYPE

Continuous full capacity production. Hard iron, interchangeable grinding plates. Self-aligning bearings. Sturdy construction. Designed by experienced engineers whose reputation is founded upon doing things right. Literature available. Inquiries invited.

ROBINSON MANUFACTURING CO.
Plant: Muncy, Pa.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
30 CHURCH ST., NEW YORK 7, N. Y.

foods, pharmaceuticals, drugs, cosmetics and tobacco fields, does not maintain its own laboratory, conducting research through committees and advisory boards of both producers and users.

Viscount Portal heads PATRA. Walton D. Lynch, vice-president of National Folding Box Co., is president of the Packaging Institute. Technical committee chairman of the latter organization is Charles A. Southwick, Jr., Shellmar Products Co.

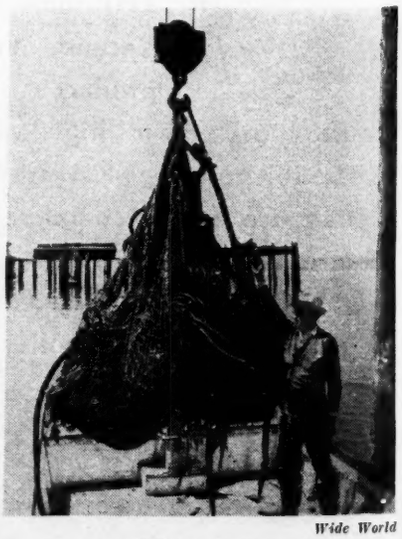
Expand Production of Monosodium Glutamate

GREATLY expanded production of monosodium glutamate is promised in plans for additional facilities, recently revealed by A. E. Staley Manufacturing Co., and International Minerals & Chemical Corp.

Despite building delays, International hopes to have its new plant, at San Jose, Calif., completed early in 1947. The output of this new plant is expected to double the company's present production of monosodium glutamate at Rossford, O.

The Staley company is building an addition to its plant at Decatur, Ill., according to A. E. Staley, Jr., president. When completed and in operation, the new unit will have an annual capacity of more than 1,000,000 lb. of monosodium glutamate and other amino acid products, derived from the major processing operations of the company.

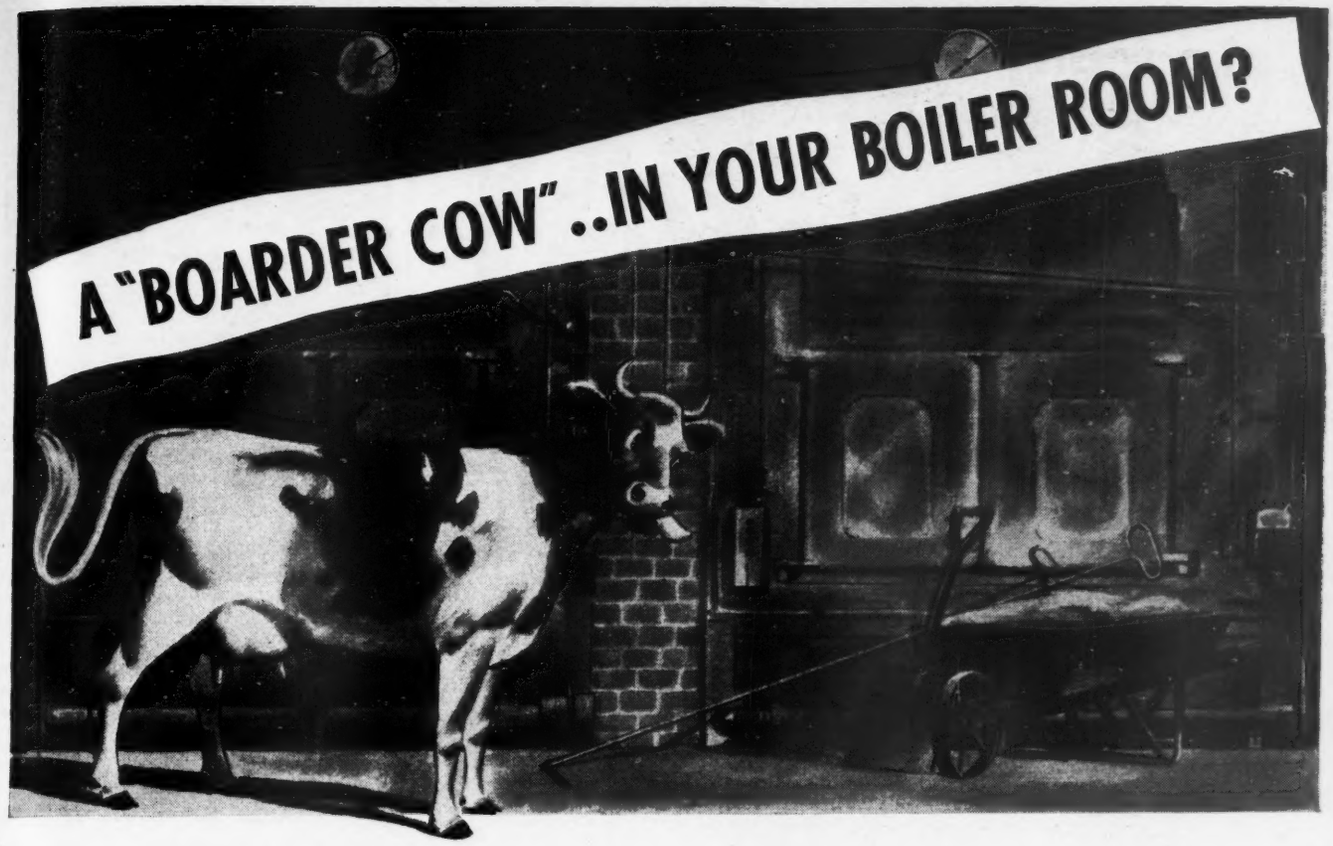
Sales of these products are said to be 80 percent greater this year than they were in 1945.



Wide World

HEALTH FOOD

This load of seaweed, along with many other loads, is destined for conversion into health food, at Anacortes, Wash., where the necessary treatment is being provided by O. Rappe, pictured here, and E. Loeb.



If you are familiar with dairy farming you know the significance of the expression "boarder cow" — the "critter" that feeds prodigiously but yields only a bare minimum of milk.

Some steam boilers are like boarder cows — eating enormous amounts of fuel for minimum yields of steam.

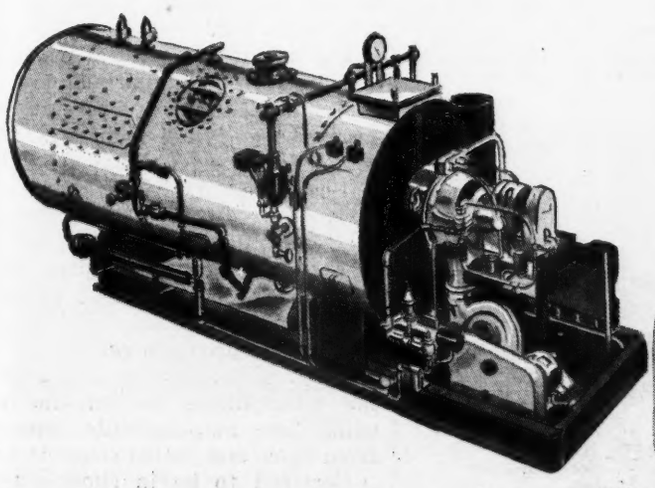
Check your operating budget to realize the money-loss involved in faulty steam generating. It's a needless loss, too, for steam generating costs can be substantially cut — service vastly improved.

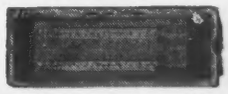
A custom-planned, application-engineered Cleaver-Brooks Steam Generator installation has made lower fuel and steam costs a reality in scores of plants. Here are some of the reasons:

- A steam plant tailored for your job. Cleaver-Brooks analyzes your load conditions, space and equipment arrangements, future growth needs, puts unit into initial operation, instructs as to operation, care, maintenance.
- Designed for utmost convenience of operator—all controls may be operated from front of boiler. A factory engineer puts unit into initial operation, and trains your employees in operation, care, maintenance.
- One source and one responsibility for the complete generator—Cleaver-Brooks factory-finished and tested—a fully "packaged" unit meeting all code requirements.
- Fast installation. No special foundation needed. Within 24 hours after arrival, your Cleaver-Brooks Steam Generator can be in operation.
- No smoke-stack required; simple roof-high vent exhausts combustion gases.
- Saves space, uses less plant area, fits into low head-room locations.
- Oil-firing eliminates smoke, ashes, clinkers, messy boiler-room conditions.
- Low operating costs; unsurpassed guarantee:—80% thermal efficiency from full load down to 30% of its rating; 13% CO_2 gases; stack temperature not to exceed 125° F. above standard steam temperature.
- Quick steaming—for any emergency or fluctuating loads—through high heat transfer with Cleaver-Brooks 4-pass down-draft construction and integral oil-burner.
- Full-size range is available—22 models in sizes from 15 to 500 h.p., at steam pressures from 15 to 200 lbs. p.s.i. Write for bulletin and complete information.

CLEAVER-BROOKS COMPANY

327 E. KEEFE AVENUE MILWAUKEE 12, WISCONSIN





Cleaver-Brooks
STEAM GENERATORS

WRITE on your business letterhead for the Free Steam Cost-Calculator — a ready-reference slide rule showing the comparative steam costs when using oil or coal as fuel.

To Many Points in the U. S.

SAME DAY DELIVERY

AIR EXPRESS
RAILWAY EXPRESS AGENCY, INC.

AT LOWER RATES!

NOW!
THE LID IS OFF!
MORE PLANES, MORE FLIGHTS — FOR EVERYBODY
PRIORITIES NO LONGER NEEDED!

AIR SPEEDS up to five miles a minute — one thousand miles in less than four hours — that's how fast your shipments go in the great new planes in use today!

THAT'S WHY an ever-increasing number of same-day deliveries are now being made between many towns and cities in this country.

REDUCED RATES include special pick-up and delivery in all major U. S. towns and cities. Rapid air-rail schedules between 23,000 off-airline communities.

FOREIGN SERVICE

Direct service by air to and from scores of foreign countries. Many are served overnight.

RATES CUT 22% SINCE 1943 (U. S. A.)					
AIR MILES	2 lbs.	5 lbs.	25 lbs.	40 lbs.	Over 40 lbs. Cents per lb.
149	$1.00	$1.00	$1.00	$1.23	3.07¢
349	1.02	1.18	2.30	3.68	9.21¢
549	1.07	1.42	3.84	6.14	15.35¢
1049	1.17	1.98	7.68	12.28	30.70¢
2349	1.45	3.53	17.65	28.24	70.61¢
Over 2350	1.47	3.68	18.42	29.47	73.68¢
INTERNATIONAL RATES ALSO REDUCED					

WRITE TODAY for the Time and Rate Schedule on Air Express. It contains illuminating facts to help you solve many a shipping problem. Air Express Division, Railway Express Agency, 230 Park Avenue, New York 17, N. Y. Or ask for it at any Airline or Railway Express office.

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AIR EXPRESS
GETS THERE FIRST

Phone AIR EXPRESS DIVISION, RAILWAY EXPRESS AGENCY
Representing the AIRLINES of the United States

Wide World

FLYING STEAKS

Here is why you could get a steak in some of the larger restaurants during the past several months. The American Meat Co., in Kansas City, trimmed and quickfroze them, then loaded them onto a cargo plane bound, in this case, for New York City.

Anderson Designates Foods in Short Supply

UNDER the provisions of the Price Control Extension Act of 1946, ceiling prices can be maintained on agricultural commodities only if they are in short supply. The Secretary of Agriculture has defined "agricultural commodities" as including "any manufactured food or feed product containing a third or more by weight or volume of such commodity or commodities, but not to include nonfood manufactures, such as clothing or textiles, or noncompetitive imports such as coffee, cocoa, and bananas."

When an item is manufactured or processed from one of the specific commodities named on the short supply list, the fact that it contains as much as 20 percent of that short commodity would be sufficient to include it as if that item had been specifically named in the secretary's list.

The list of agricultural products certified to be in short supply on September 1, by the Secretary of Agriculture did not include a number of food items, which are automatically decontrolled thereby.

Canned peas, lima beans, asparagus and mixed vegetables; frozen lima beans, corn, green peas, canned apricots, plums, and prunes; frozen fruits; dried apples and other apple products except canned apples and applesauce are among the commodities not on the list, which are automatically removed from price and ration control.

Certified to be in short supply

TEA TIME *Treat*

Here's a popular recipe for a cheerful interlude before the open fire on a bleak day . . . hot buttered toast, tea and marmalade. But the piquant flavor of Wellman's Bitter Sweet Marmalade is so appealing that with many families it is a favorite around the clock. Lunches, bridge parties, buffet suppers or bed time snacks . . . this marmalade seems to fit right in.

Wellman's Orange Marmalade is manufactured from fresh California fruits and cane sugar by Wellman Peck & Company at San Francisco. This company, which has nine distributing plants in California, is another on the long list of names prominent in the food field using Crown Screw Caps as a closure for their products. Only Crown Screw Caps have the patented Deep Hook Thread which grips under the glass thread of the container. They give a tighter seal with any given amount of application force, yet they are easy to remove. Crown Cork & Seal Company, Baltimore 3, Md. *World's Largest Makers of Metal Closures.*

CROWN CLOSURES

DEATH TO FLIES*

IN AREAS OF 500,000 CUBIC FEET! THE NEW WEST HYDRO-MIST VAPORIZER AUTOMATIC — JUST FILL AND PLUG IN!

A new, outstanding and completely automatic insecticide sprayer. Simple to operate—merely fill, set time clock, and plug in to AC or DC outlet. One filling of the West Hydro-Mist Vaporizer with Vaposector Fluid will efficiently control roaches in an area up to 50,000 cubic feet, and achieve a POSITIVE KILL of flying insects in areas of 500,000 cubic feet!

CONCENTRATED VAPOSECTOR FLUID

Amazingly Effective Insecticide for use in the West Hydro-Mist Vaporizer

VAPOSECTOR FLUID is a concentrated insecticide especially effective for use in Electric Sprayers. It has a high killing efficiency and is economical and highly effective against flies, roaches, mosquitoes, ants, fleas, crickets, spiders and many other insects. It will cause roaches to crawl out of their hiding places to be killed easily This insecticide is harmless to food and fabrics, when used according to directions

*Vaposector Insecticide when dispersed by the Hydro-Mist Vaporizer can achieve a positive kill of such flying insects as Flies, Gnats, and Mosquitoes in areas of 500,000 cubic feet!

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We are interested in a demonstration of the West HYDRO-MIST VAPORIZER. ☐

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and therefore eligible for rationing and price control were such processed foods as—canned apples, applesauce, peaches, pears, pineapple, fruit cocktail, fruit salad, mixed fruits, peach juice and nectar, pear juice and nectar, and pineapple juice; jams, jellies, preserves and fruit spreads; canned corn, tomatoes and tomato products (except soup) and mixed vegetables; all grades of edible syrups and molasses; and certain species of canned and frozen fish.

As it is officially explained, "On commodities certified in short supply, which are now under control, maximum ceiling prices remain in effect unless specific decontrol action is taken. On the other hand, on commodities that are certified in short supply, but have been decontrolled, price control is not automatically restored. Inclusion on the short supply list merely makes them eligible for recontrol. To be brought under price control again, these commodities would have to be recommended for such action by the Secretary of Agriculture with the written consent of the Price Decontrol Board or—in the case of commodities decontrolled by the Board —by the Board itself.

"For example, corn and wheat—both of which were left decontrolled by the Price Decontrol Board—are on the short supply list. Their inclusion on the list does not restore them to control but does make them eligible for such action. The inclusion also means that any food or feed products currently under control which are manufactured or processed from them continue under control."

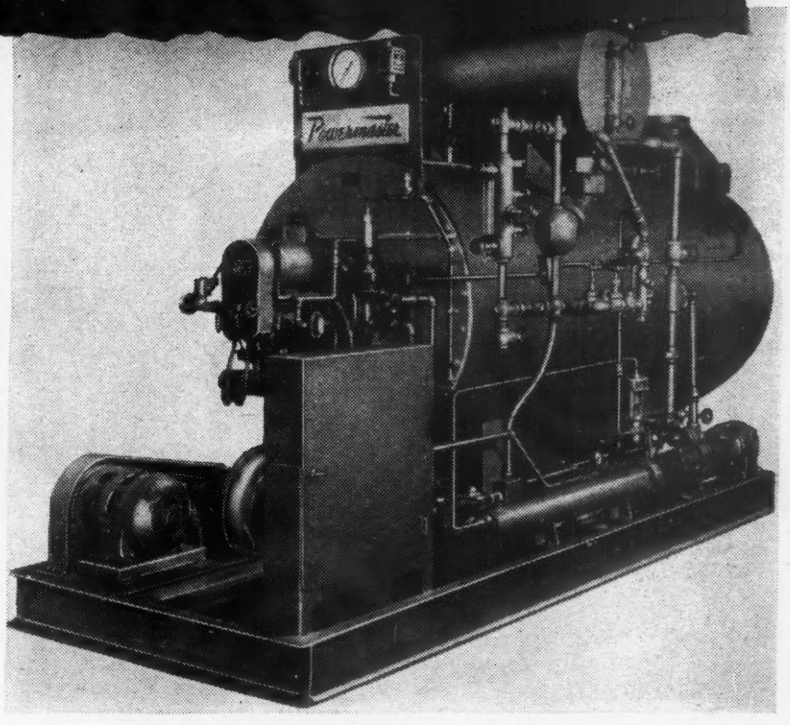
Propose Two Sizes As Pallet Standards

Two sizes of pallets were unanimously approved for proposal to the Food Industry as standard for the handling of groceries and packaged merchandise, by the general conference on pallet simplification, which met in Washington August 15. Next step will be the approval of the central advisory committee, for the proposal for final acceptance by members of the industry, the manufacturers, distributors, users and others affected.

The approved sizes are 40x32 in., 2-way or preferably 4-way for equipment having a capacity of 2,000 lb. or less, and 48x40 in., 4-way, for equipment having a capacity of 3,000 lb. or more.

Extensive loading and shipping

"Plenty of low-cost Steam at all times from the O&S Powermaster"



Hundreds of launderers and dry cleaners throughout the country are getting ample steam automatically in as little as 18 minutes from a cold start. "In 19 years of laundry operation," reports a Newark laundry owner, "I never saw a boiler to equal the Powermaster for steady pressure and all-around performance."

Wherever you go the story's the same—enthusiastic testimonials to the speed, efficiency and economy of the Orr & Sembower Powermaster Steam Generator.

Equipped for both light and heavy oil firing, the Powermaster Unit operates at thermal efficiencies of approximately 80%, maintained in everyday use.

Being fully automatic, it eliminates the need for time-consuming preparation and constant attention to valves, gauges and controls. A flick of the switch starts and stops the Powermaster with minimum manual attention.

Its forced draft feature, efficient arrangement of heating surface and compact design combine to save valuable plant space. And because the Powermaster is assembled on a steel base, pre-tested at the factory and delivered in one complete unit, installation is quick and easy—accomplished with practically no interruption to your plant operation.

The O&S Powermaster Steam Generating Unit is backed by 61 years of boiler design and manufacture. You will find thousands of O&S users throughout U. S. and the World who get dependable steam at low cost in everyday operation.

It's all in the Engineering! Boiler, oil-burner, condensate return and automatic control systems are combined in one "packaged" unit tested to A. S. M. E. standards. Find out how to save installation, maintenance and operating costs with the Powermaster. Mail Coupon below for O&S Bulletin #1214.

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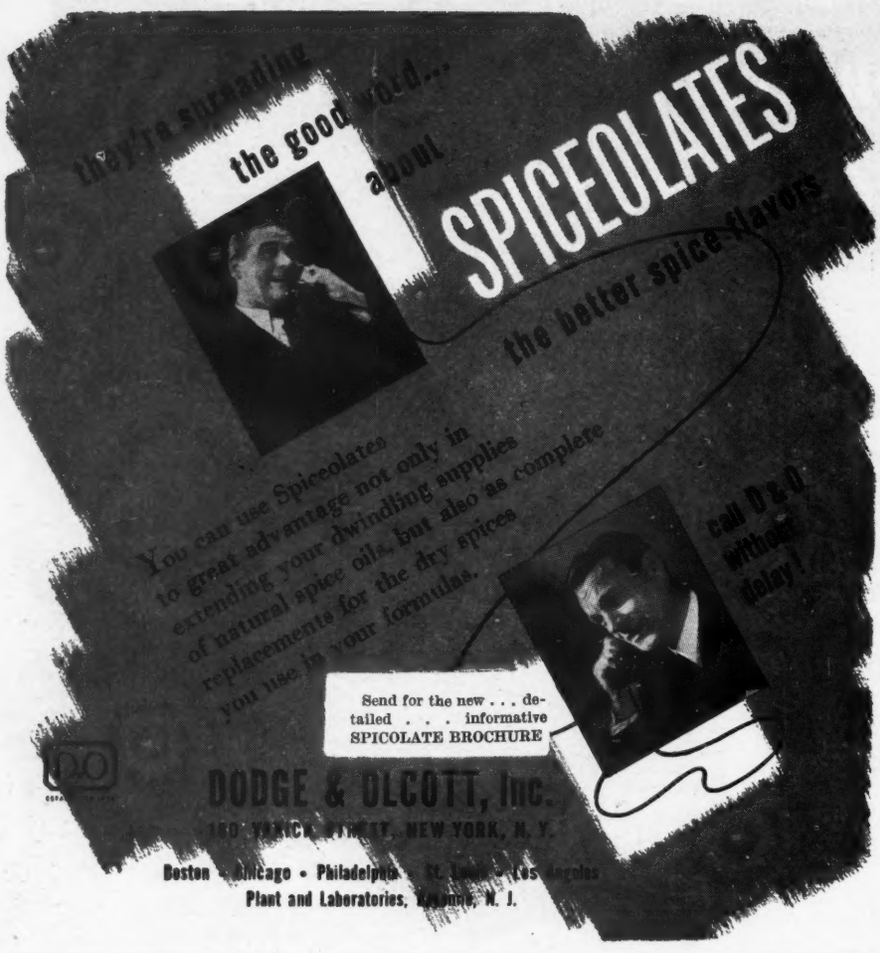
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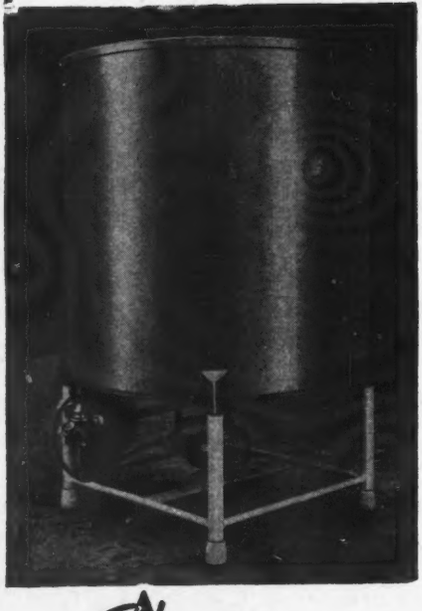

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tests support the choice of these two sizes. One dimension of 48 in. is generally favored because of its adaptability to car widths and lumber lengths. The 40 in. dimension is adaptable to refrigerator car doors and highway truck dimensions. The smaller pallet 40x32 in., for smaller wholesale grocers, loads equally well in railroad cars and trucks.

A practical rental service, national in scope, to overcome the problems of ownership return and exchange was brought before the meeting by the representative of one of the nation's largest warehouse companies.

Packers Unload Help While Feeders Hold On

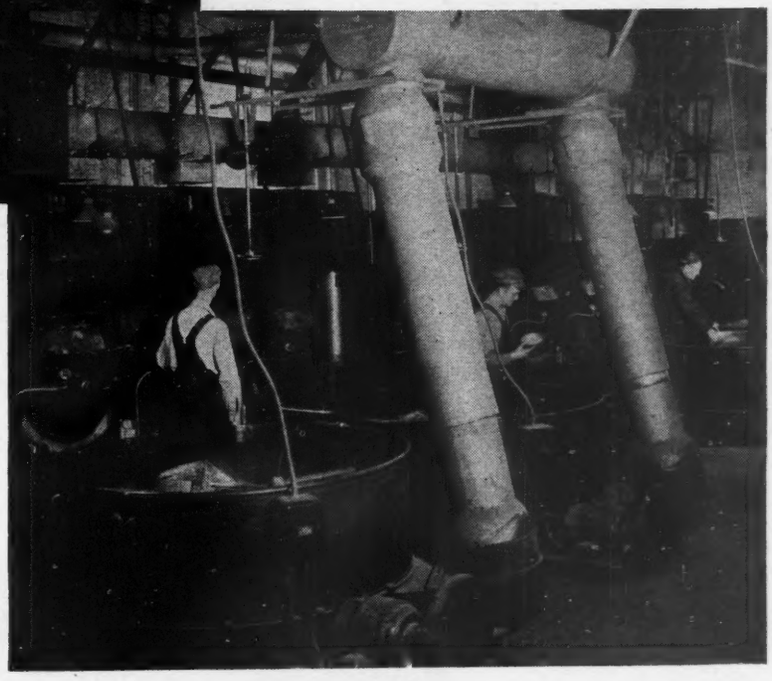
PROBABLY the least confused elements in the country's meat stew, in late September, were the meat packers, themselves. They had laid-off all employees not required for plant cleanup, painting and repair and maintenance tasks. And even these jobs were limited to the amounts of materials available.

Despite earlier warnings, the famine caught most segments of the consuming public by surprise, which was just beginning to turn to full fledged anger and resentment. Feeders holding the short spring pig crop and the relatively short supply of finished feeder cattle noted Secretary Anderson's warning that price ceilings were going to stand. He urged the release of livestock "to a hungry pub-

British Combine

FOOD HANDLERS

Britain's Smithfield Technical Training School, at Battersea, London, trains over 1,100 boys and adults for the meat and other food trades. At the top, the student butchers are at work, and at lower left the tools are undergoing inspection. The diploma at the course's end is well earned.



Top: Micromax Recorders show malt roasting temperatures in the Manitowoc, Wis., plant of Rahr Malting Co. Right: General view of the roasting room.

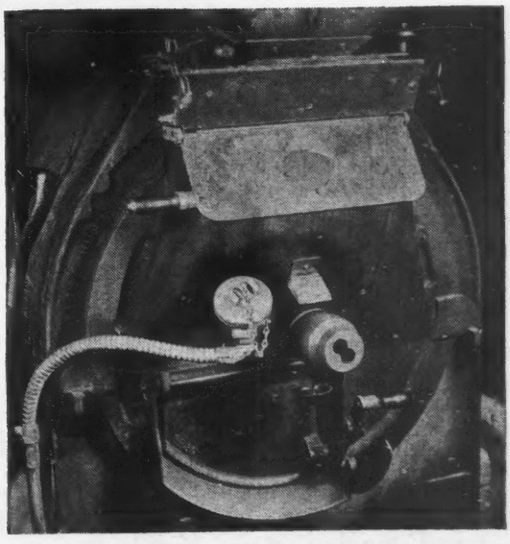
Malt Roasting Guided By Micromax Recorders

Close control of malt roasting was greatly simplified for the Rahr Malting Company when Micromax Temperature Recorders were installed for each of the 9 horizontal, gas-fired Roasters.

Because the Micromax instruments are so big and easy to read, roaster operators can, if they like, read temperature dials all the way across the room . . . or they may, as in the picture above, come closer and read the permanent, 24-hour charts which give the performance record.

Changes in room temperature or humidity; any corrosion of wires, or the remoteness of instrument from roaster . . . have no effect on either the accuracy or the sensitivity of Micromax Recorders. The equipment's sturdy construction resists vibration and other usual manufacturing conditions. And should a detecting thermocouple, or a leadwire to the Recorder, become damaged, replacements are made without influencing the Recorder's calibration.

Catalog N-33A describes Micromax Temperature Recorders and thermocouples and will be sent on request.



Front of Jabez Burns & Sons Roaster. Inserted besides the longitudinal shaft is the sturdy L&N thermocouple which detects roasting temperatures for Micromax Recording.

LEEDS & NORTHRUP COMPANY, 4912 STENTON AVE., PHILA., PA.

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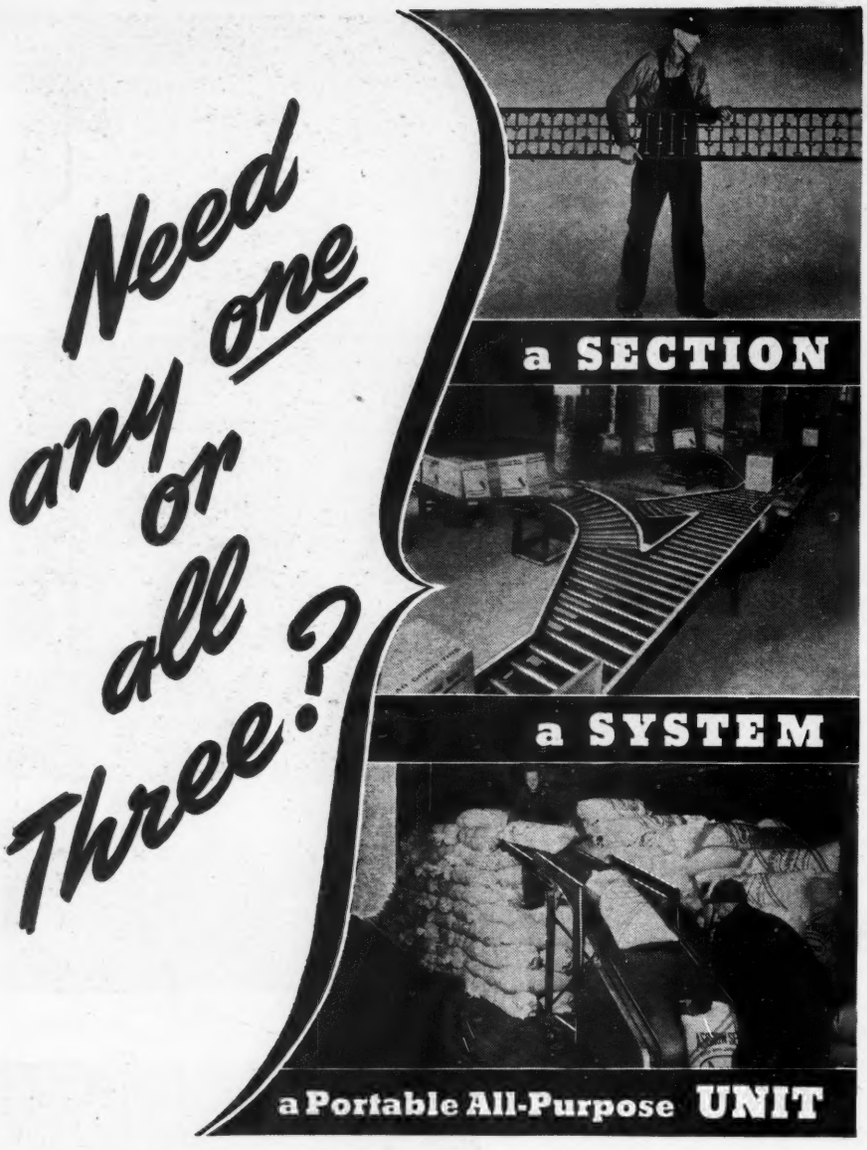

THE range and versatility of Standard Conveyor equipment is the result of nearly 40 years of close contact with conveying problems — large and small installations.

If you need just a light, portable section of conveyor to speed handling in warehouse or on shipping platform — complete, continuous flow system linking manufacturing or packaging operations — or a portable unit to speed handling in storage and shipping areas — Standard Conveyor Company can supply you with any one or all three.

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lic" as soon as it was ready, adding that it would be dangerous to assume that the present farm price policy was a "one way street, the only direction being up."

On the other hand, Rep. John J. McCormack, House Majority leader, was asking that price controls on meat be suspended for at least 60 days. This, and similar statements, from other sources, offer small hope that OPA would remove price controls soon enough to encourage the marketing of available livestock, including grassfed cattle, before the cold weather sets in. This hope was further dimmed at month's end by President Truman's refusal to seek either suspension or increase of meat price ceilings.

Slaughter Quotas

RETURN of price control brought the return of slaughter quotas for all slaughtering plants Federally-inspected and non-Federally-inspected alike. Big change in the program over that in effect prior to the OPA hiatus is the merging of all slaughter quotas under authority of a single agency, the OPA.

PROCESSING

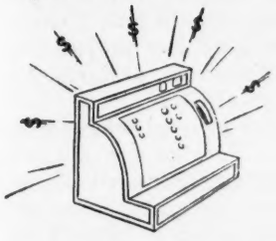
High Frequency Heat Needs Much Research

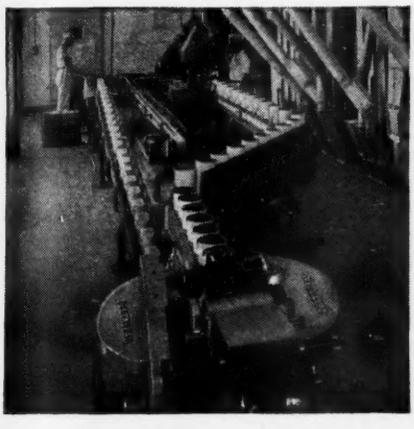
HIGH frequency heating as applied to the food industry is still much in the experimental stage. This was the general conclusion drawn from the conference on that subject held in San Francisco, September 5 and 6.

While it was conceded that high frequency heating is desirable in food preservation because it promises a method of preserving foods without subjecting them to high temperatures for long periods, it was also pointed out that the industry will have to await further developments before undertaking any radical departures from established practices. The industry will also have to supply the necessary funds for research before science can bring about these developments.

There was disagreement at the meeting on the point of whether each substance possesses its own high frequency vibratory response. J. M. Jackson, research division, American Can Co., cited the Food Industries article (April, 1946, vol. page 506) by V. W. Sherman, who termed the theory a "popular misconception." Kenneth A. Smith, Electronic Chemical Engineering

The story of a FOOD $ALE





1. The food processor cut packing costs by using the Bemis Deltaseal System of Packaging. Bags were packed with savings in paper, time and manpower.

2. The grocer selected Deltaseal-packed bags for a mass display because they stack and handle easily. Furthermore, he knows they are sanitary and siftproof.

3. The housewife was attracted by colorful, eye-catching brand printing and all-round sales appeal of the mass display. This, of course, increased volume.

4. Here's a repeat sale in the making. She finds the Deltaseal Bag ideal for cupboard storage and it has the "easy-pour" spout that almost closes itself.

Bemis provides a complete packaging set-up — closing machinery, service and bags—when you use the Deltaseal System. Call your Bemis representative today. There is no obligation.

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...and the first choice for the right insulating job is the Johns-Manville Insulation Applicator.

Even the finest insulation must be properly applied to provide maximum efficiency. That's why refrigeration engineers rely on the combination of J-M Rock Cork and the skill of J-M Applicators.

Basically mineral in composition, Rock Cork is made in both sheet and pipe-covering form. Both provide advantages that plant operators and engineers appreciate . . . low thermal conductivity, exceptional resistance to rot, moisture and vermin.

And you can be sure that Rock Cork will be applied to give you maximum use of its high insulating efficiency. Johns-Manville Insulation Applicators are fully trained in all phases of application. They employ only skilled mechanics and the most up-to-date methods of application.

Write for brochure DS-555, or see your J-M Insulation Applicator. Johns-Manville, Box 290, New York 16, N.Y.

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Johns-Manville ROCK CORK

Co., Los Angeles, defended the theory, claiming the support of many actual experiments. The experiments reported by T. M. Shaw, Western Research Laboratory, also seemed to substantiate the theory. Mr. Shaw further pointed to the successful use made of dielectric heating in thawing frozen foods and in helping to solve the problems of a manufacturer of Boston brown bread, by its action on moulds.

Pennsalt Has Manual On Handling Fluorine

To supply available information on properties and precautions for handling fluorine to purchasers of this rare and highly reactive element, the Pennsylvania Salt Manufacturing Company has prepared a preliminary manual, designated Pennsalt Manual F-1.

Because general commercial shipments of fluorine are such a recent development, Pennsalt desired to pass on to potential users all present information to bring their data up to date before beginning research with the gas. In June Pennsalt announced it was offering fluorine generally for research purposes for the first time.

Pennsalt officials said since this is a preliminary manual to meet an immediate need, it will not be given the broad circulation now given to other basic Pennsalt manuals, such as the ones on Caustic Soda and Chlorine. In addition to going to research laboratories selected for first deliveries, the manual will be distributed to a small list of industrial firms and universities and a few technical libraries.

The manual outlines the chemical and physical of fluorine and gives instructions on handling.

Levulose Extraction Process Announced

A METHOD of extracting levulose —a sugar that is half again as sweet as ordinary sugar—has been developed by the University of Colorado Engineering Experiment Station, Dr. Robert C. Hockett, scientific director of the Sugar Foundation announced.

The new production method was developed by Martin M. Reynolds, junior research engineer at the university, working with Dr. Carl W. Borgmann, director of the U. of C. Experiment Station. The project is sponsored by the Sugar Research Foundation.

In the new method developed by Reynolds, ordinary sugar—either

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In its service, National Can reflects almost half a century of metal container experience — reflects, also, the ingenuity of its engineers in applying their knowledge to your problems.

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For production economy and efficiency, you must, of course, have good valves to begin with. That's why maintenance men prefer Lunkenheimer longer-life Valves . . . correctly engineered, quality built, dependable.

Yet in themselves even the best valves are not enough. A convenient source of supply and dependable service are equally important.

Lunkenheimer Distributors, located in principal industrial centers, render a *complete* valve service that saves time, trouble and money. Trained, qualified representatives are at your call to help with your valve problems.

For better, experienced valve service, call your nearest Lunkenheimer Distributor.

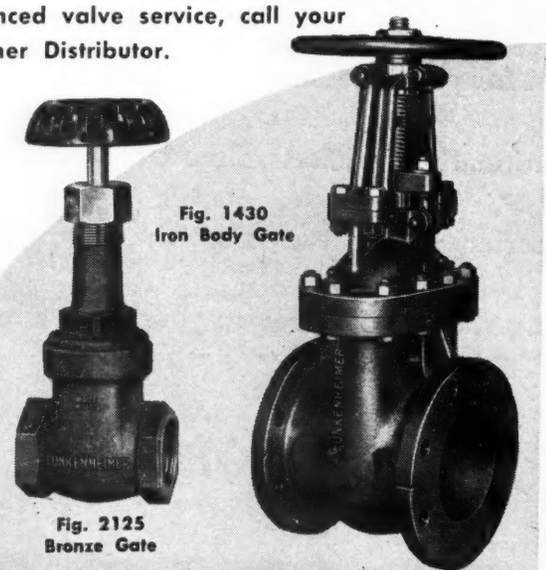

Fig. 1430
Iron Body Gate

Fig. 2125
Bronze Gate

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Wide World

TWO-FRUIT TREE

Here is a fruit tree that goes in for variety, producing both apples and cherries. As both fruits ripen at the same time, the young lady is presented with something of a problem. The tree is in Davenport, Ia.

beet or cane—is the raw material, and a new lime precipitation method is the means.

The levulose solid is easily removed from the lime by bubbling CO_2 through the solution. The lime gives up the levulose in preference to the carbon dioxide, leaving levulose in solution. After evaporation, this sirup is placed in an ice cream freezer and slowly stirred until crystals form.

Food Standards

FOOD Standards issued recently by U.S.D.A. Production and Marketing Administration include the following:

Tentative U. S. Standards for Grades of Frozen Berries, Effective August 15, 1946. U. S. Standards for Grades of Canned Tomatoes, Effective August 1, 1946. U. S. Standards for Grades of Canned Plums, Effective August 15, 1946. Milled Rice Standards Revised, September 5, 1946. Sweet Potato Grades Revised, Effective July 22, 1946. Standards of Identity for Shucked Oysters, Effective January 1, 1947.

Research Associates

A NEW foods research laboratory was opened last month by the recently organized consultant firm of Donald K. Tressler Associates, at Westport, Conn. Besides Dr. Tressler, who is well known in the fields of food preservation and food by-products, the association includes Howard P. Milleville, who recently resigned his position at the Eastern

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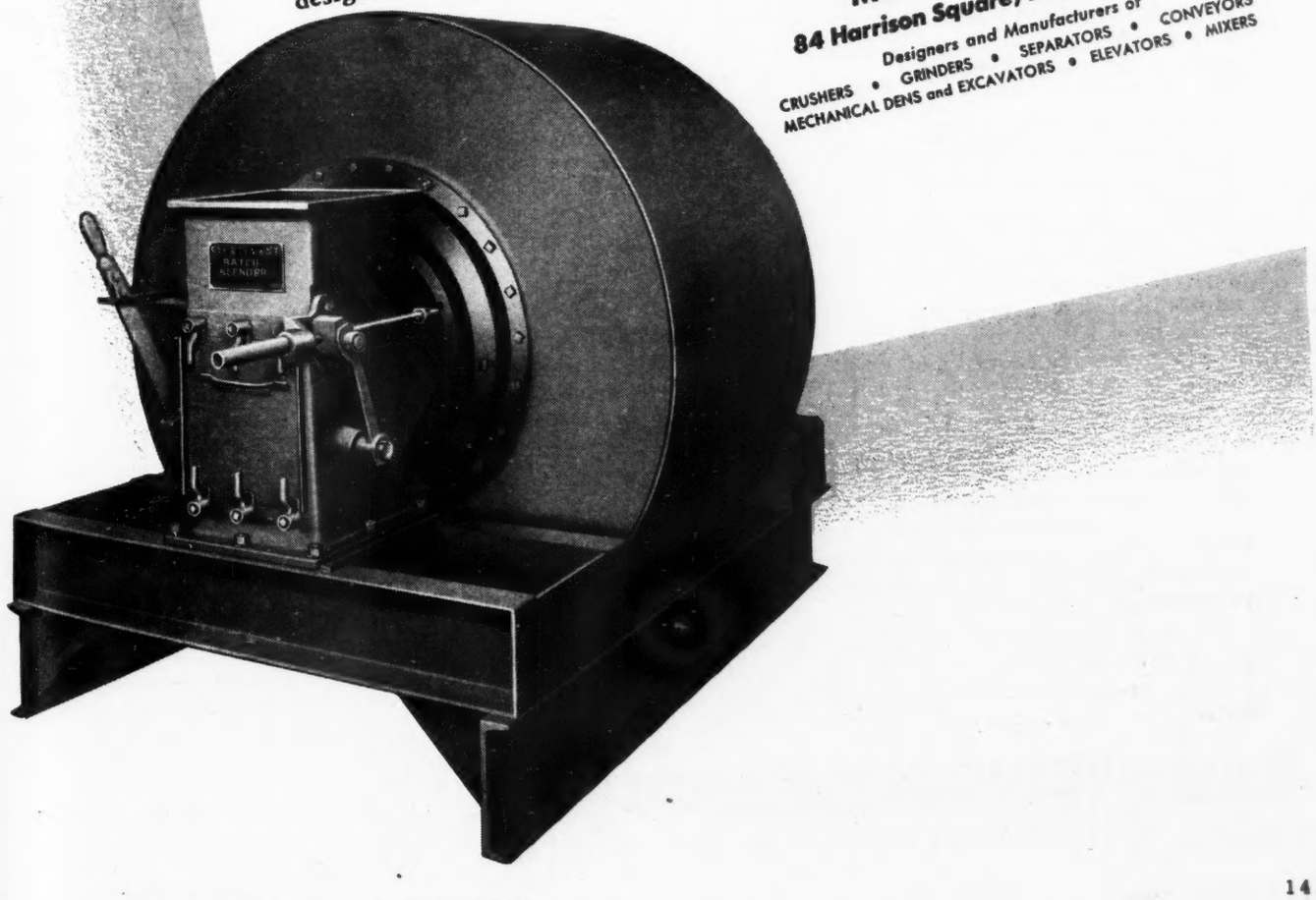
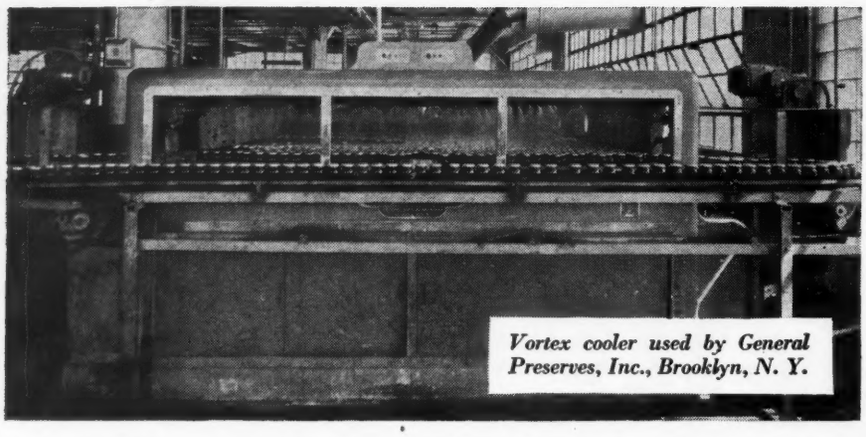
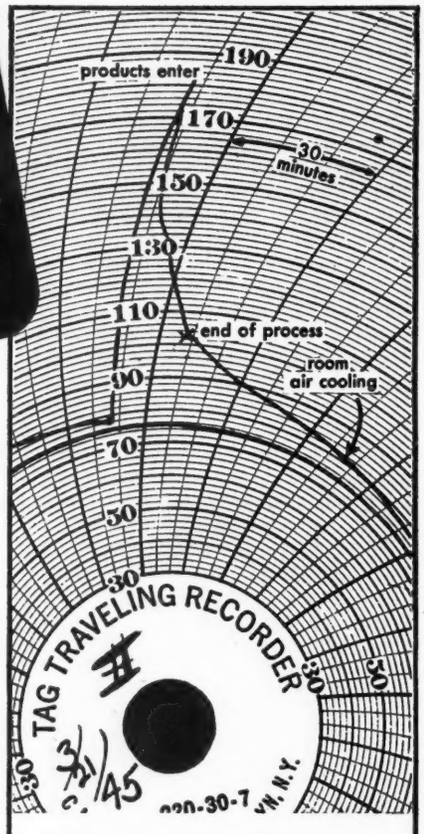




Vortex cooler used by General Preserves, Inc., Brooklyn, N. Y.

Your Hot Packaged Foods Deserve

VORTEX Automatic Cooling



The process recorded above is cooling 1 lb. hot marmalade jars 80° F. within 20 minutes to packing temperature.

Automatic cooling of your products deserves scientific treatment to preserve the original flavors and clarity by *positive* control of time and temperature.

The Vortex system is entirely automatic in operation and can be run continuously without operators, requiring only routine maintenance. The heat exchange medium is atomized water, distributed over the containers in such a manner that maximum cooling is achieved with a minimum quantity of water.

Vortex coolers are widely adaptable to individual requirements and have an almost limitless capacity range for all sizes of jars, bottles or cans. The use of these machines greatly conserves floor space and allows for immediate labeling and packing. A rapid drying system can be supplied with the discharge conveyors, if desired.

Whatever your problem of cooling—or heating—your products, it will pay you to learn the Vortex method of achieving uniform results economically. Send us your process requirements and write for bulletin No. 87 today.

BARRY-WEHMILLER MACHINERY CO.

1946.... Our 61st Anniversary St. Louis, Mo., U.S.A.

Regional Research Laboratory, USDA, in Philadelphia, Clarence W. DuBois, formerly with the New York State Agricultural Experiment Station, at Cornell University and recently head of the food preservation department, Louisiana State University, Mrs. Lillian Farkas, home economist and Miss Lucy Long, magazine writer.

QMC To Test Formula For New Canned Bread

THE Quartermaster Food and Container Institute, Chicago, will test over 3,000,000 cans of bread this fall. A formula for canned bread has been developed by the Institute to replace the wartime ration biscuit and will be tested under field conditions by soldiers of the U. S. Army to determine its acceptance by men of varied tastes from various sections of the United States. Potential users of this type of bread other than the Armed Forces, are ranchers in isolated areas, hunters and sportsmen as well as explorers.

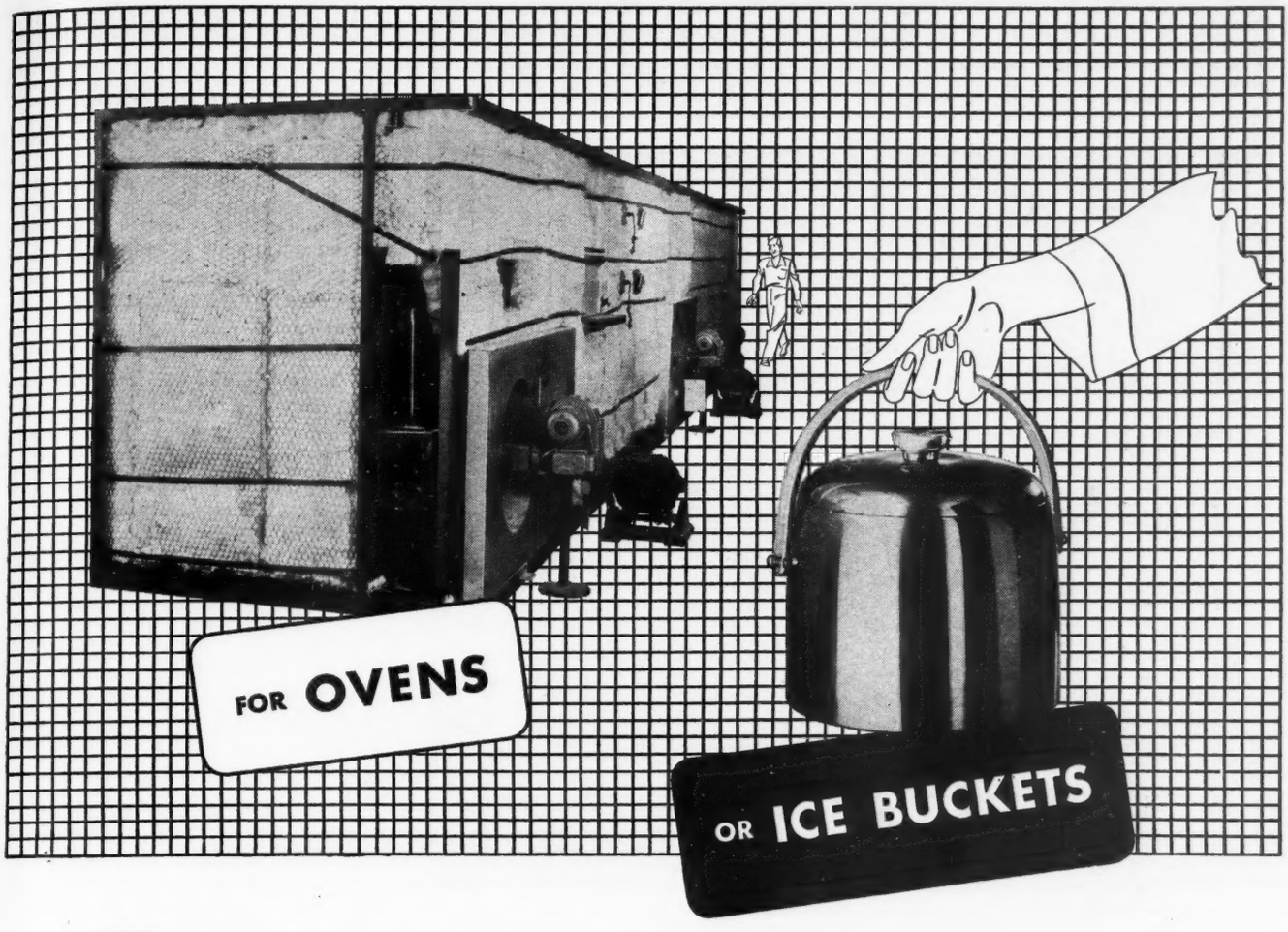
Bakers who participate in this test will receive supplementary rations of sugar and shortening. Cans of two different sizes will be used, 300x308 and 401x411.

List Tariffs, Quotas On Agricultural Items

REVISION of a Department of Agriculture summary entitled "United States Tariff Rates On Agricultural Products" has been announced. Last issued in July 1941, the new report covers tariff rates and excise taxes, including "excise taxes on the first processing in the United States as imposed by various Revenue Acts, when these excise taxes are protective in effect". The publication also covers U. S. import quotas on agricultural products, with all information up to May 3, 1946. Copies of the 121-page mimeographed publication are available on request from Bureau of Agricultural Economics, USDA, Washington 25, D. C.

Book Catalog

THE 1946 edition of the McGraw-Hill Book Co.'s catalog makes an important departure from previous editions in that publication dates, or the date of the last revision of each book will be listed. The company also announced a general price increase to average about 10 percent on approximately 90 percent of its books.



FIBERGLAS helps keep 'em hot or cold

Fiberglas Thermal Insulations are used in practically every phase of food handling and processing. In transportation equipment and cold storage plants, in domestic ranges and refrigerators, in bake ovens, vessels and other equipment used in food processing plants, commercial bakeries, hotels and institutions —Fiberglas makes possible greater accuracy in temperature control.

For example, Fiberglas Thermal Insulating Materials are used in the large Read Bakery Ovens to assure precise control of oven temperatures. And Fiberglas helps keep ice cubes solid in the Kromex Frig-i-tor* ice-cube bowl for longer periods of time.

Fiberglas is the trade name for these Thermal Insulating Materials and many other products made of light, strong, moisture and heat resistant, ageless glass in pliable fiber form.

Being glass, the fibers are noncorrosive to metals in the presence of moisture. Fiberglas Thermal Insulation combines high insulating efficiency with light weight. It is resilient, doesn't settle or pack down leaving voids through which heat can pass. Fiberglas is there to stay!

Fiberglas may be the answer to some of your problems. Complete information about Fiberglas Thermal Insulations, Electrical Insulating Materials, "Dust-Stop" Air Filters, Fiberglas Yarns and Cloths or Fiberglas Mats, will be furnished on request. Write: Owens-Corning Fiberglas Corporation, Dept. 2009, Toledo 1, Ohio. Branches in principal cities. *In Canada: Fiberglas Canada Ltd., Toronto, Ontario*

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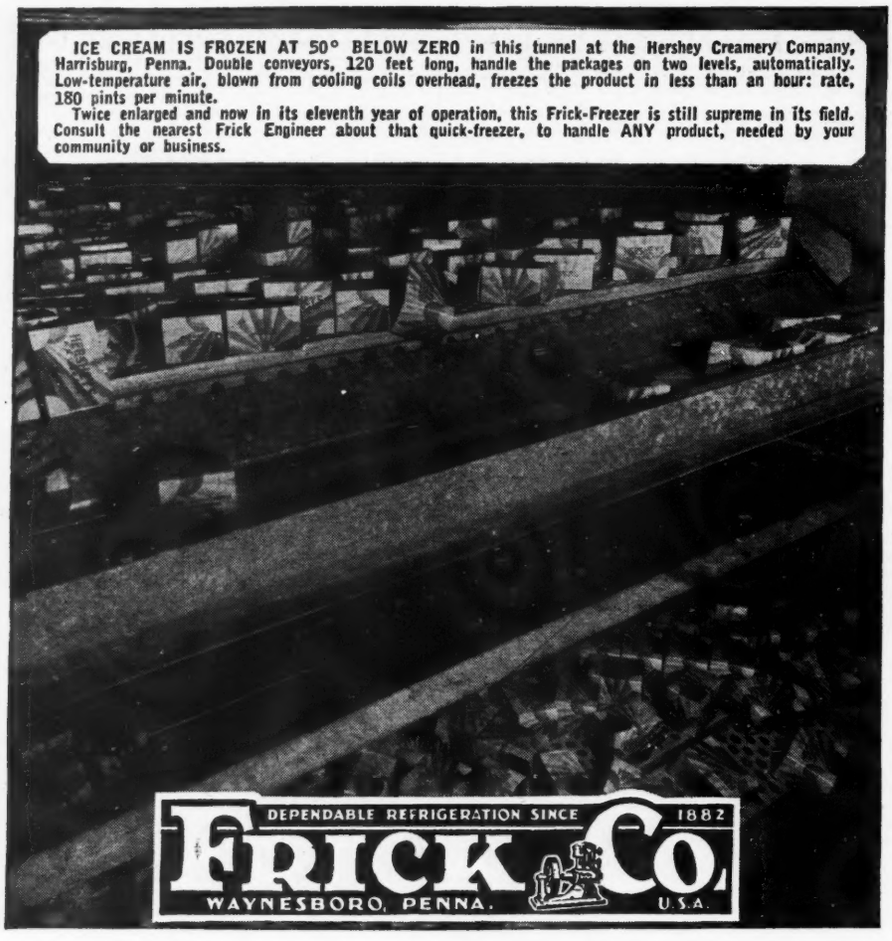
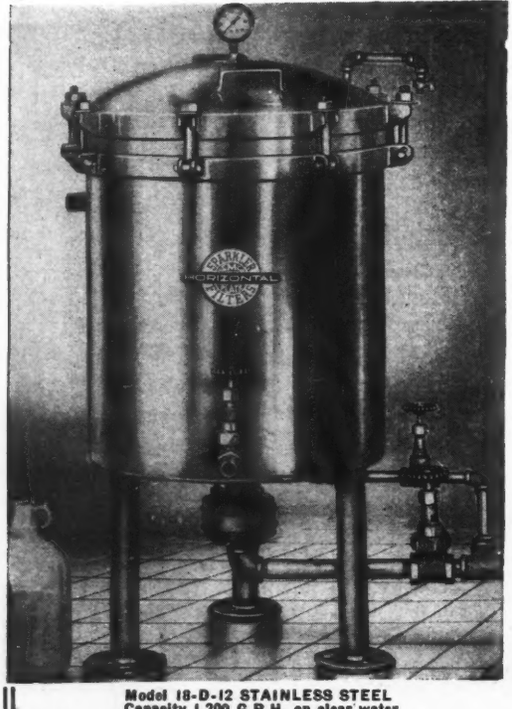

ICE CREAM IS FROZEN AT 50° BELOW ZERO in this tunnel at the Hershey Creamery Company, Harrisburg, Penna. Double conveyors, 120 feet long, handle the packages on two levels, automatically. Low-temperature air, blown from cooling coils overhead, freezes the product in less than an hour: rate, 180 pints per minute.
Twice enlarged and now in its eleventh year of operation, this Frick-Freezer is still supreme in its field. Consult the nearest Frick Engineer about that quick-freezer, to handle ANY product, needed by your community or business.
DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA. U.S.A.

what you want *in a filter*

Sparkler's

HORIZONTAL PLATE design



Model 18-D-12 STAINLESS STEEL
Capacity 1,200 G.P.H. on clear water

gives you—

1. — Uniform, high quality results to the end of each cycle.
2. — Complete filtration of every batch; no unfiltered holdover. Cakes may be blown dry.
3. — Ease of cleaning; disposable filter media.
4. — *Ease of recovery of solids.*
5. — Even the largest units may be portable.

Capacities 60 to 10,000 G.P.H.

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SPARKLER MFG. CO.
277 Lake St., Mundelein, Ill.

SPARKLER HORIZONTAL PLATE FILTERS

Improved Grain Supply Shown in Flour Action

RESTORATION of the normal milling extraction rate on September 1, was tangible evidence of the improved supply of bread grains. Domestic supplies of wheat for 1946-47 year are estimated by the U. S. Department of Agriculture to amount to more than 1,261,000,000 bu., 1,160,000,000 bu. from the current crop and 101,000,000 bu. carry-over.

The Department estimates 475,000,000 bu. of wheat will be used for food, which, with other uses, will bring domestic disappearance to 710,000,000 bu. during the current year, leaving 550,000,000 bu. available for export and carry-over. Present estimates indicate 275,000,000 will be exported leaving a carry-over on July 1, 1947, of the same amount.

World wheat production for 1946 is expected to be 10 percent or more above last year and about equal to the five year pre-war average. Because wheat reserves have been exhausted, the national wheat goals for 1947, announced in August, were for 71,700,000 acres, approximately equal to the 1946 acreage.

Wartime restrictions against "twisting" and "cross-panning," in the manufacture of pan bread, have also been lifted as the result of improved supplies of labor and materials.

Gift bread racks may again become sales tools of the bakers as a result of removal of war-time restrictions against the supplying of bread racks by bakers and distributors to their customers.

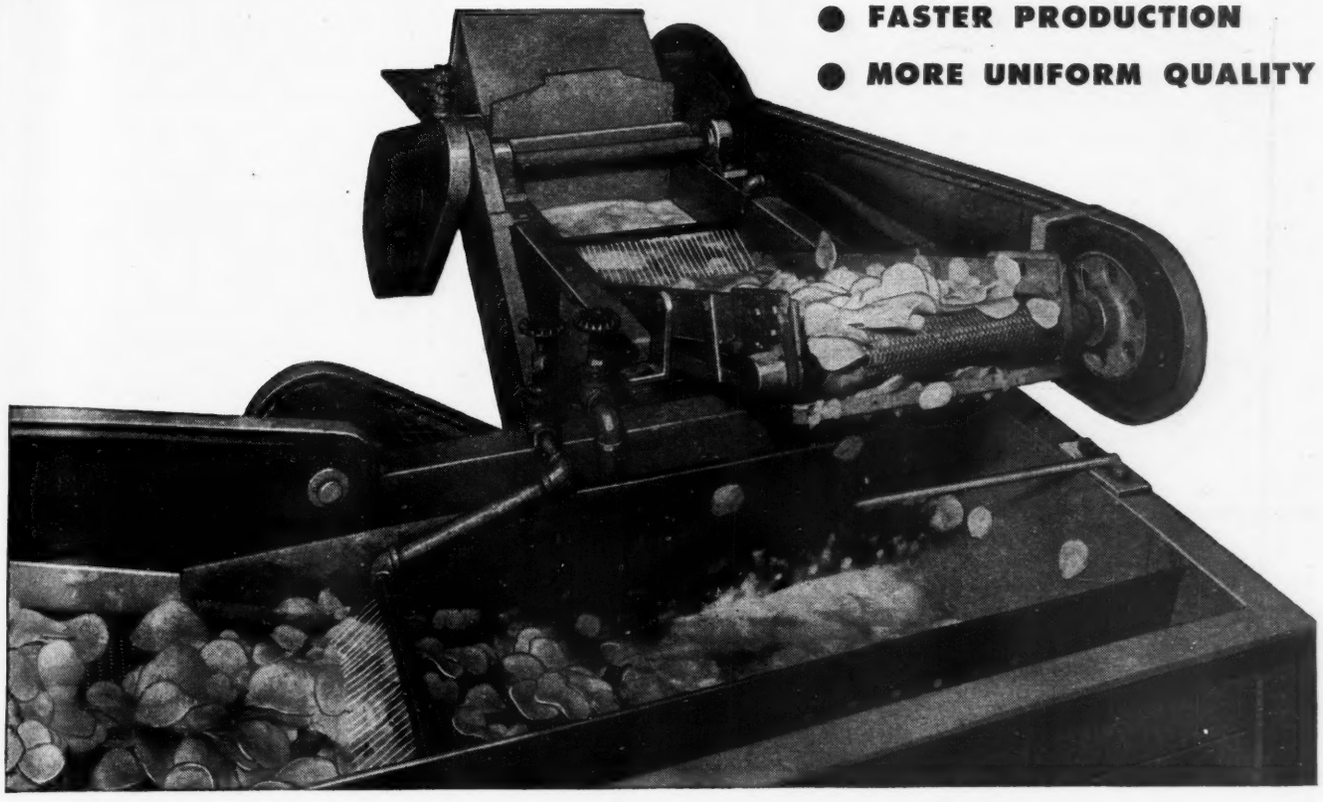
The discontinuance of the 80 percent extraction requirement in the production of wheat flour has made it possible to discontinue the limitations on receipts of wheat mill feeds and the restrictions on their use in the manufacture of mixed feeds. However, mixed feed manufacturers are still prohibited from using more than 85 percent of the grain or grain products used during the corresponding month of 1945.

Pepper Imports

PEPPER started moving toward this country almost as soon as ceiling prices were removed in late August. First shipments are expected here before November 1. Import au-

WISSCO CONVEYOR BELTS PROVIDE

- **FASTER PRODUCTION**
- **MORE UNIFORM QUALITY**



The acceptance by industry of Wissco Metal Conveyor Belts may be accounted for by their many cost-cutting characteristics.

Typical of innumerable industrial applications is the use of Wissco Belts in potato chip and julienne machines, meat fryers, dehydrating and pretzel equipment. In the machine shown above, potato chips are carried through washing, frying and draining operations on Wissco chain-driven, stainless steel belts. Wissco Belts not only provide the free drainage necessary for such operations, but help assure faster production and more uniform quality with a minimum of manual attention.

All Wissco Metal Conveyor Belts are custom-engineered—some to withstand the high temperatures encountered in heat treatment of metals, glass and ceramic ware—others to withstand corrosive chemical action. Belts are built of any metal or alloy capable of being drawn into wire; in any length, and in widths from 1″ to 192″.

Send for our profusely illustrated catalog showing types and advantages of numerous conveyor belt constructions. Address Mechanical Specialties Dept., Wickwire Spencer Steel, Sterling St., Clinton, Mass.

WISSCO METAL CONVEYOR BELTS ARE BEING USED IN

Annealing Ovens	Decorating Glass	Degreasing
Baking Ovens	Ceramic Products	Frozen Foods
Brazing Furnaces	Canning	Hardening Furnaces
Chemical Processing	Dehydrating Food	Infra-Red Drying

WISSCO METAL CONVEYOR BELTS

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

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OFF ON

Another Mercoid Advantage

(Illustration shows a Mercoid Pressure Control)

In the event of trouble in an electric circuit, the first thing a service man checks is the switch. He wants to know whether the circuit is open or closed.

In the case of a Mercoid control in the circuit a quick glance at the position of the mercury switch tells the story. Such information however, is not so readily available in other types of switches where the contacts are concealed from the direct vision.

Every service man appreciates the various conveniences and advantages of Mercoid Controls.

It should be noted that the Mercoid mercury switch is also a means of better control performance and longer control life. All contact trouble is practically eliminated.

If you have a control problem involving the automatic control of pressure, temperature, liquid level, mechanical operations, etc., it will pay you to consult Mercoid's engineering staff—always at your service.

Write for Catalog No. 600A. It contains a lot of control information.

MERCOID
AUTOMATIC CONTROLS
FOR HEATING, AIR CONDITIONING, REFRIGERATION, AND INDUSTRIAL APPLICATIONS
THE MERCOID CORPORATION, 4201 BELMONT AVE. CHICAGO 41, ILL.

thorizations are being approved for shipments of black and white pepper from all of the more important pre-war producing areas of the East Indies and Africa. Authorizations also have been granted for import of Indian pepper allocated to the U. S. by International Emergency Food Council. Some Indian pepper already purchased by the U. S. Department of Agriculture is to be allocated to the trade before it arrives. Basis for distribution had not been announced when this magazine went to press.

Abundant Feed Crops Promised This Year

FEED grain and forage supplies for 1946-1947 feeding, promise to be the most liberal in history per animal unit. This forecast of U.S. Department of Agriculture is based on September crop conditions and prospects for winter feed supplies.

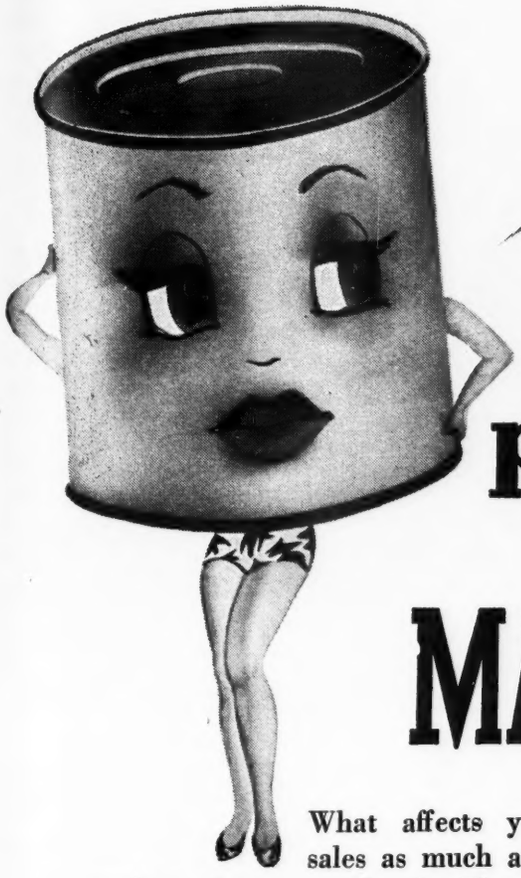
The total of feed grains available is at a record level of 129,000,000 tons, or five percent above the previous high of 1942. Thus a record animal population can be cared for, if the farmers choose to maintain flocks and herds at that level.

Actual results expected in dairy products, poultry and eggs, and animals for slaughter are not so certain. Hence, food processing industries may find quite a different result than some have forecast solely on the basis of feed quantities

Wide World

MORE BEER

Harvesting of hops was in full swing in the State of Washington, last month, as the combines swept between the rows of vines, which are held by high wires. Each machine handles two rows simultaneously, gathering and separating the pods and loading them into bags.



does your package have MAGNETISM?

What affects your sales as much as the quality of your product? The magnetism of your package! To reach your sales quotas, your product must have package magnetism—the power to draw consumers away from competing brands.

ROSSOTTI has been creating packaging with customer appeal since 1898. And the sales' records of our clients bear out the drawing power of ROSSOTTI designed labels and cartons. Such consistent success is based upon our specialized experience . . our thoroughness in analyzing your packaging problem.

We do not simply dream up some art ideas. Before we begin to design your new label or carton, we make a comprehensive analysis of your market. We study the packaging of both your national and local competitors. Only then do we create your new packaging —and give it the distinction which keeps drawing consumers to your package.

These highly skilled services and the facilities of our large modern plant are at your disposal. Contact the ROSSOTTI consultant in your region—NOW, during this postwar period when you need new packaging to compete with new competing brands. Do so without obligation.

Rossotti
SINCE 1898

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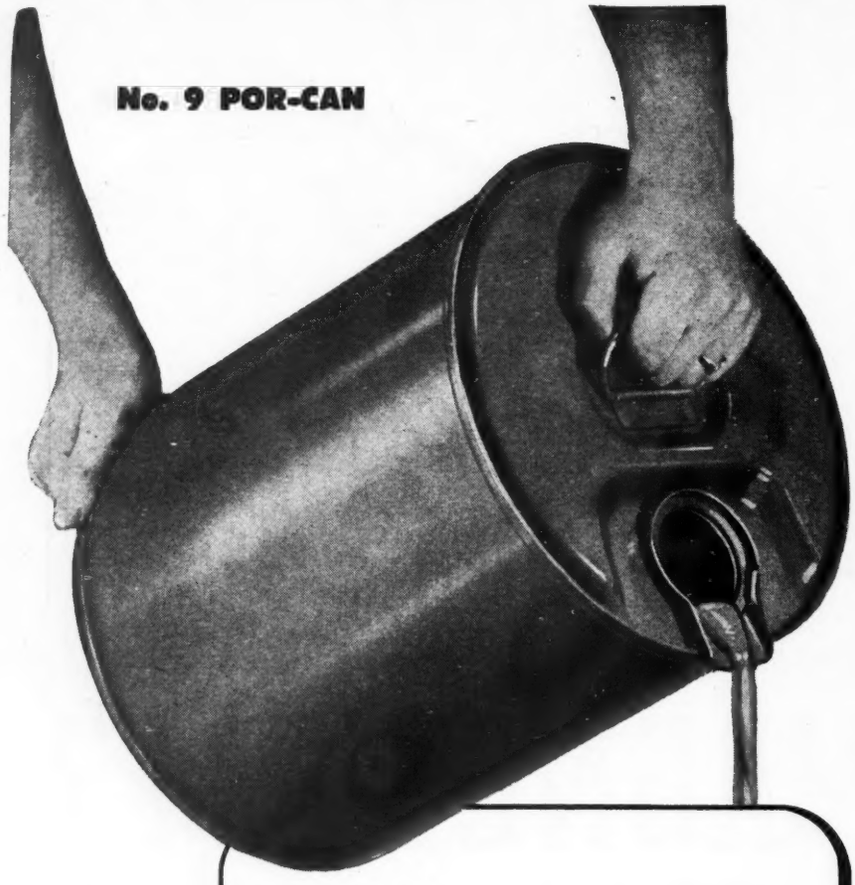
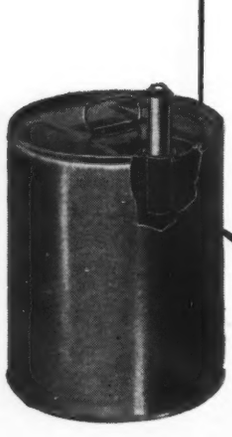


EASY TO POUR

These Por-Cans are particularly designed for packaging thin liquids. The seamed on heads and electric lap-weld construction provides unusual strength and guarantees against leakage.

The tight-sealed, easy pouring spout makes this container ideal for any liquid product.



PUSH-PULL SPOUT No. 594LPV has the same basic construction as the Swivel-Spout can, but the tube spout has advantages in handling some liquids.

INLAND STEEL CONTAINER CO.

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available. Far more likely to determine prospects, BAE economists say, will be the price ratios that develop as a result of only partial control of prices by OPA. Bitter argument over further decisions by the Price Decontrol Board seems the most certain prospect in this situation.

Short Pecan Crop

THE southern pecan crop this year will be much smaller than in 1945 because the "drop" so far this year has been greater and longer than is usual. Agricultural agents have inspected trees and found no particular reason for the excessive shedding.

It is estimated that the crops for Georgia, Florida and Alabama may be off approximately 8,500,000 lb. this year. The three-state crop is estimated at about 41,700,000 lb., as against 50,100,000 lb. last year.

SCHEDULE OF EVENTS

October

7—National Safety Council, safety congress, Hamilton Hotel, Chicago.
13-16—American Bakers Association, Hotel Sherman, Chicago.
14-15—Tea Association, 1st annual convention, Westchester Country Club, Rye, N. Y.
14-15—Boston Conference on Distribution, Hotel Statler, Boston.
14-18—American Dietetic Association, 28th annual meeting, Netherlands Plaza, Cincinnati, Ohio.
17-19—National Association of Food Chains, annual meeting, Drake Hotel, Chicago.
21-26—Dairy Industries Supply Association, 15th exposition, Atlantic City, N. J.
21-23—International Association of Milk Dealers, convention, Atlantic City, N. J.
23-25—National Bakers Supply House Association, annual fall convention, St. Francis Hotel, San Francisco.
24-26—International Association of Ice Cream Manufacturers, convention, Atlantic City, N. J.
25—National Pickle Packers Association, annual fall meeting, Bismark Hotel, Chicago.
29-Nov. 1—Refrigeration Equipment Manufacturers Association, 4th all-industry refrigeration and air conditioning exposition, public Auditorium, Cleveland.
30-Nov. 1—American Oil Chemists Society, 20th fall meeting, Edgewater Beach Hotel, Chicago.

November

13-15—University of Minnesota Milling Sanitation Short Course, Green Hall Auditorium, University Farm, St. Paul, Minn.
17-20—Master Brewers Association of America, 39th annual convention, William Penn Hotel, Pittsburgh, Pa.
19-21—American Bottlers of Carbonated Beverages, 28th annual meeting, Miami, Fla.
25-26—Packaging Institute, 8th annual convention, Stevens Hotel, Chicago.
25-26—American Butter Institute, annual meeting, Morrison Hotel, Chicago.

December

4-5 —Tri-State Packers Association, fall meeting, Benjamin Franklin Hotel, Philadelphia.
10-11—Ohio Canners Association, annual meeting, Deshler-Wallick Hotel, Columbus, Ohio.

A Worthington VSA Type Refrigeration Compressor — Vertical, Single-Acting, Two-Cylinder, Enclosed

"Ask" is right — because there isn't much you can tell these handlers of highly perishable foods about the necessity for top-quality refrigeration. They know what equipment failure can mean, and they demand refrigeration systems that are positive in action, instantly responsive to control, unfailingly dependable.

That's why, in so many up-to-date dairy plants, you'll find Worthington Refrigeration Compressors. For example, the VSA Type shown. Made in five sizes, 6" x 6" to 10" x 10", its better all-around performance is the result of many advanced features. Such as:

Main and outboard bearings of the self-aligning, double-row type; force-feed lubrication for cylinders, bearings and pins, with renewable-element oil filter; safety head with ground joint to reduce slop-over hazard; unit-type manifold with stop, by-pass and pump-out valves and improved, quick-opening relief valve. And, on suction and discharge, the exclusive Worthington Feather* Valve — lightest, quietest, most efficient of all compressor valves.

FOR YOUR REFRIGERATION NEEDS

In the complete Worthington line, there is a compressor for every refrigeration job, large or small, in every industry. And as makers — not merely assemblers — of most of the "inner vitals" of its refrigeration systems, Worthington can furnish you with a completely *integrated* system, in which all elements work together smoothly for a long, efficient and economical service-life.

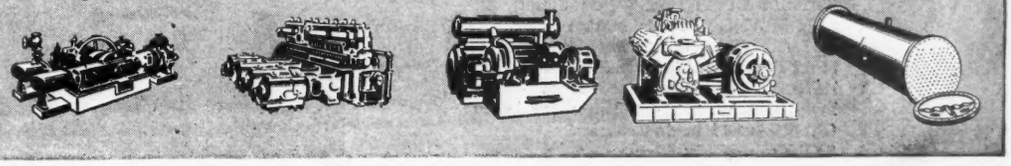
Bulletin C-1100B18A describes Worthington VSA Type Refrigeration Compressors. We'll gladly send it, and any other helpful information concerning your particular requirements . . . Or, your nearby Worthington Distributor or District Office can give you the same facts, along with further proof that *there's more worth in Worthington.* Call on them any time. *Worthington Pump and Machinery Corporation, Harrison, N. J. Specialists in air conditioning and refrigeration machinery for more than 50 years.*

*Reg. U.S. Pat. Off.

WORTHINGTON

A6-20

FIVE MORE REASONS WHY WORTHINGTON LEADS IN INDUSTRIAL REFRIGERATION


Horizontal compressors for all types of refrigerants
Angle gas engine compressors
Centrifugal compressors
Compressors for Low Pressure Refrigerants
Shell and tube refrigerating equipment

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THE PROOF OF THE MEDIUM IS IN THE RESPONSE

A regular advertiser in THE CHRISTIAN SCIENCE MONITOR makes this important statement: "*We have absolute proof that Monitor readers support Monitor advertisers and we hope to merit a continuation of this support for a long time to come because the Monitor will be at the top of our list when we plan our advertising budget.*"

The MONITOR continues to be at the top of many primary media lists, because in its pages good advertising produces better than average sales. In other words, MONITOR advertisers consistently receive tangible proof that their messages are read, believed, acted upon.

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SYDNEY: 46 Pitt Street

The CHRISTIAN SCIENCE MONITOR
An International Daily Newspaper

Changes in Food Supplies

(Indicators)

Production

Flour production, in August, rose to 15,738,738 sacks, a gain of 1,806,487 sacks from the previous month, according to the Northwestern Miller's reports, which represent approximately 71 percent of the industry. Production for August, 1945 was 16,022,176 sacks.

Durum production was down 16,000 sacks from the previous month, in August, reaching only 705,414 sacks from durum products. This was a decrease of 3,415 from August, 1945.

Lard production was up in July, reaching 116,245,000 lb., as compared with the June output of 75,806,000 lb.

Ice Cream production, in July, was the highest ever recorded, 98,005,000 gal. This as 16 percent above June, 80 percent above the July, 1945 output and 74 percent above the recent five-year average for the month. Production for January through July totals 452,900,000 gal. 84 percent above the same period in 1945.

Alaska canned salmon production was running nearly 1,000,000 cases under the previous year, in mid-August, according to the National Canners Association. A total of 2,659,691 cases of all varieties was reported on August 17, as against 3,636,969 reported on Aug. 18, 1945.

Peanuts milled during July dropped to a record low of 47,000,000 lb., 11,000,000 lb. under June. Heavy operations earlier in the season, however, resulted in cumulative total millings of 1,650,000,000 lb. since September 1, 1945. This is slightly higher than for the same period a year earlier.

Creamery butter production, in July, estimated at 127,760,000 lb., was 7 percent higher than the June output, but 18 percent smaller than the July, 1945 production and 29 percent under the recent five-year July average. This was the first time in more than 20 years that July production showed an increase over June.

American cheese production in July declined from June at about the normal seasonal rate. The output, estimated at 87,310,000 lb., was about 10 percent under the previous month.

Materials

Durum wheat crop estimate for 1946 was increased to 37,578,000 bu., as of September 1, according to Glenn G. Hoskins, Chicago. This compares with 35,020,000 bu. harvested in 1945 and leaves a net available for macaroni products of 27,378,000 bu., after deductions for seed, feed and cereals.

Cottonseed production estimates will not be available until December. However, if the ratio of lint to cottonseed should be the same as the average for the past five years, production would be 3,732,000 tons. Production in 1945 was 3,664,000 tons, as compared with the ten-year average of 5,240,000 tons.

Cranberry harvests will total the third largest on record, with a yield estimated at 788,100 barrels. This compares with the 1937 record crop of 877,800 barrels and the 1942 output of 812,200 barrels.

A total of 30,807,000 chicks were hatched by commercial hatcheries during July, a 71 percent drop from July, 1945 production and 41 percent less than the 1940-44 July average. Hatchings for the first seven months of the 1946 are down 23 percent from the like 1945 period.

Turkeys being raised this year are estimated at 41,013,000, as of August 1. This is 9 percent less than the record crop of last year, but 27 percent above the 1938-42 average.

Sugar imports, for the first half of 1946, came to 2,785,566 short tons raw value, 534,309 tons less than was imported in the first half of 1945. This was largely because more raw sugar could be shipped to European refineries from Cuba. Domestic cane and beet shipments were up 81,780 tons from the first half of 1945.

Indexes

The commodity index on food, compiled by the New York Journal of Commerce, was 129.9 for the week ending September 15. This compared with 129.8 for the previous week, and with 107.5 for September, 1945.

Business Week's index of business activity stood at 183.0 for the week ending September 7. It was at 183.8 the month previous and and at 172.9 the previous year.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded September (thousands)	Total Awarded 1946 (thousands)
Bakery	$55	$114	$4,233
Beverages	739	295	23,133
Canning and Preserving	550	.....	5,913
Cold Storage	100	658	7,729
Confectionery	925	.....	2,380
Grain Mill Products	.....	145	12,649
Ice, Manufactured	55	.....	1,060
Meats and Meat Products	.....	90	2,467
Milk Products	1,665	475	11,567
Miscellaneous	.....	814	19,780
	$4,089	$2,591	$90,851

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FOR CONTROLLING air, water, gas, steam, light and heavy oils, and refrigerants, etc. Suitable for pressures up to 1,000 pounds and temperatures up to 400°F.

Internal valve assembly can be removed for cleaning and inspection if necessary. Two-wire—A.C. or D.C. —current failure—packless construction—bronze body—stainless steel and bronze internal parts—soft seats available.

SIX TIMES THE POWER of ordinary solenoid valves. This feature assures high seating pressure and overcomes the effect of viscous fluids, such as heavy fuel oil. Adequate power of the solenoid insures positive operation. Available in normally closed or open types.

FOR COMPLETE SPECIFICATIONS on temperature, pressure and flow controls for industrial applications write for new 1946 Catalog 52C or contact Factory Branch or Distributor near you.

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FACTORY BRANCHES: PHILADELPHIA • ATLANTA BOSTON • CHICAGO • KANSAS CITY • NEW YORK DALLAS • DENVER • DETROIT • CLEVELAND HOUSTON • SAN FRANCISCO • SEATTLE • PITTSBURGH
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PLASTIC APRONS!

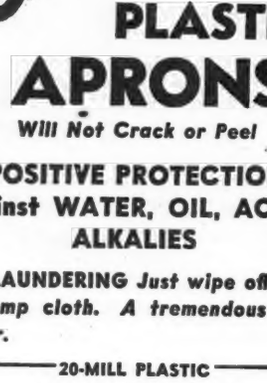
Will Not Crack or Peel

POSITIVE PROTECTION against WATER, OIL, ACIDS, ALKALIES

NO LAUNDERING *Just wipe off with a damp cloth. A tremendous cost saver.*

20-MILL PLASTIC

An Outstanding New Product
AMAZING DURABILITY—Laboratory test and actual use show this special plastic 10 times stronger than cloth. Won't tear!
Costs only about 1 cent a day



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27 x 36..$ 6.62 per doz.
30 x 36.. 7.53 per doz.
36 x 40.. 7.96 per doz.
36 x 44.. 8.85 per doz.
Full Length Sleeves $6.00 per doz. pair

BLACK or WHITE—8 Mill Plastic
30 x 36..$ 8.17 per doz.
30 x 36.. 8.87 per doz.
36 x 40.. 10.10 per doz.
36 x 44.. 12.38 per doz.
Full Length Sleeves $9.66 per doz. pair
Leggings Hip Length $11.90 per dozen pair

BLACK—12 Mill Plastic
27 x 36..$ 9.31 per doz.
30 x 36.. 10.15 per doz.
36 x 40.. 12.95 per doz.
36 x 44.. 14.35 per doz.

MAROON—Heavy Double Coated Neoprene
27 x 36..$12.90 per doz.
30 x 36.. 14.00 per doz.
36 x 40.. 18.33 per doz.
36 x 44.. 20.50 per doz.
Full Length Sleeves $12.90 per doz. pair
Leggings, Hip Length $23.50 per doz. pair

BLACK—Heavy Double Coated Neoprene
27 x 36..$12.90 per doz.
30 x 36.. 14.00 per doz.
36 x 40.. 18.33 per doz.
36 x 44.. 20.50 per doz.
Full Length Sleeves $12.90 per doz. pair
Leggings, Hip Length $23.50 per doz. pair

WHITE — Extra Heavy 20 Mill Plastic
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What Washington Thinks

By R. S. McBRIDE, Washington, D. C.

BIG LUNCH BUSINESS—Congress has made permanent the plan for free school lunches at public expense under Public Law 396 signed by the President in June. Department of Agriculture figures show that 6.6 million pupils were served during 1945 under the temporary program with $76,000,000 worth of lunches. Larger food sales through these channels are anticipated as more cities and states discover the advantage of having Uncle Sam pay half or more of the school lunch bill.

"LET'S SIT TIGHT"—The new president of the Chamber of Commerce of the United States, William K. Jackson, urges that everybody sit tight in order not to rock the economic boat as it bobs on the choppy seas of reconversion. The comment is addressed to industrial executives directly, but publicized for others also. Washington does not expect that the politicians seeking re-election will adopt the motto, except as it may be applied by the "ins" seeking to get re-elected.

WHERE IS THE CLOCK?—Food plants are seldom large enough to make directly serious the effect of a recent United States Supreme Court decision. But the philosophy back of that decision is very important to many food factories. The Court decided that employees must be paid after they have passed the time clock at the outside gate, even though long time intervals elapse thereafter before they reach their actual working place, ready for factory duties. In a few establishments where the time gate is remote this may add up to many man-hours per week. But even in the small factories it must be noted that the Court says that walking through the factory, dressing for the job, tool sharpening, lighting up, opening windows, and other preliminary activities count as work, for which payment must be made and for which time must be considered in calculating overtime. Assignment of such routine duties to highly paid operatives thus becomes very wasteful. The plant management must work out schemes by which junior personnel at lower hourly rates do these minor tasks, or they will be paying extravagantly for them. And, specifically, the placing of the time clock itself becomes important.

TRANSPORT TROUBLES—The car shortage grows worse week by week. There is no prospect of improvement for many months, as repair and replacement of freight cars of all classes is seriously limited by shortage of materials and scarcity of skilled construction workers. Offsetting that difficulty of getting cars is the slight comfort that the ICC has slowed down the general freight-rate-increase case. It now looks as though it would be Christmas or later before any decision can be reached on the general case in which the rail carriers ask for a 25 percent boost in freight charges. Meantime, they work along with a much smaller temporary emergency relief.

A "GOOD" CONGRESSMAN—The CIO, each election year, publishes a list of the Congressmen up for re-election, presenting their record in voting on important issues of concern to organized labor. Members of the union and friends are urged to support at the polls those who have "voted right". There is little, if any, evidence that these same factual lists have ever been used by the more conservative elements in the community to secure votes against those who represent the radical labor element in Congress. Washington quietly discusses this phenomenon, and wonders why.

CHANGES RESISTED — Congress enacted a considerable number of provisions regarding restoring of profit levels in business and the decontrolling of prices and distribution rules under certain conditions. OPA has made a great show of compliance. But some of the important trade associations of Washington claim, with evidence that is rather persuasive, that there is an organized resistance within

CHANGE OF ADDRESS

DIRECTOR OF CIRCULATION, FOOD INDUSTRIES
330 WEST 42nd STREET, NEW YORK 18, N. Y.

Please change the address of my Food Industries subscription.

Name .....

Old Address .....

New Address .....

New Company Connection.....

New Title or Position.....

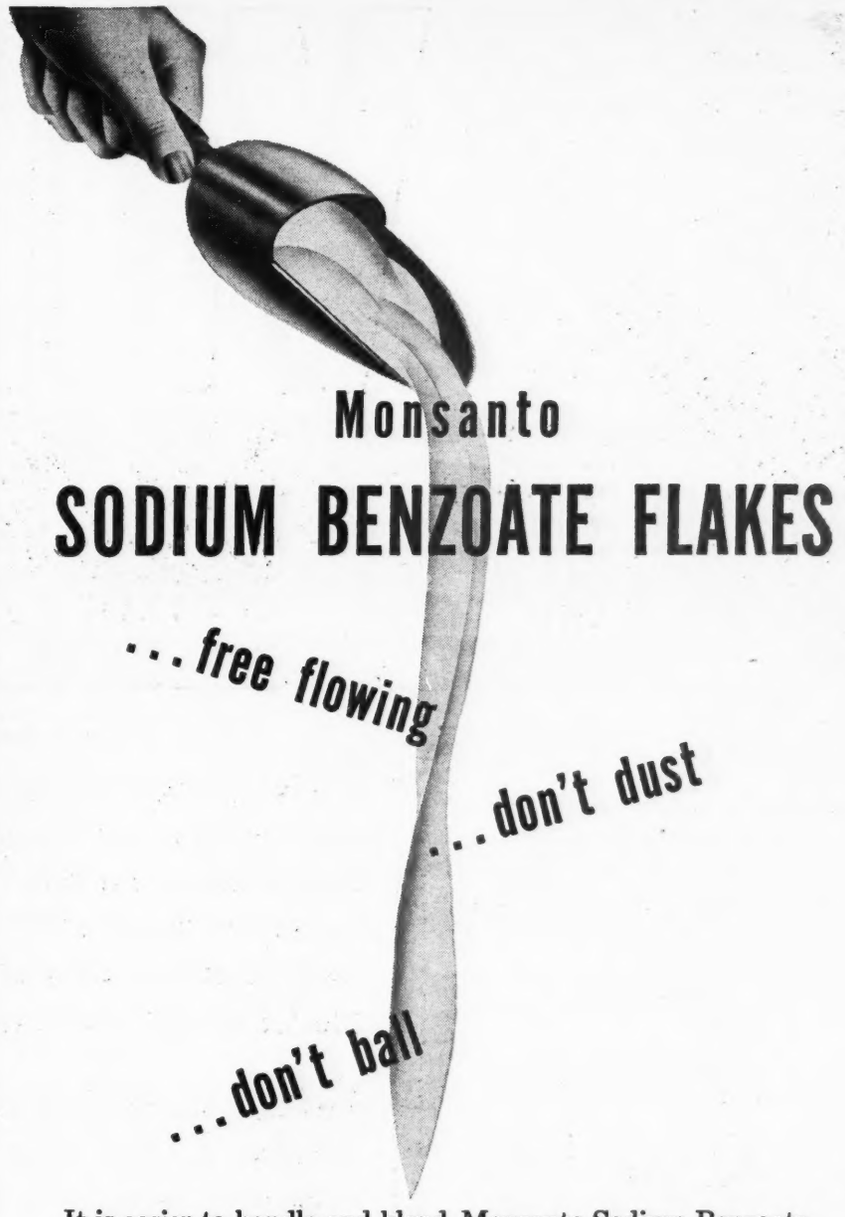
OPA to these features of the law. For example, it is stated that OPA has an elaborate mass of red tape through which industry must find its way in order to prove its rights under these features of the new control act. There can be no question as to the desire of the OPA staff to keep controls, despite broad disclaimers of that motive on the part of spokesmen. And, in order to get free from price ceilings and distribution controls, industry certainly must organize effectively. A single company seldom has enough influence to get either attention or favorable action on its "rights."

CO-OPS CONTINUE GROWTH—Department of Agriculture estimates indicate that 4,500,000 persons held membership in agricultural cooperatives a year ago. Substantial growth since then is also reported. Business done by the co-ops increased by about $500,000,000 in the fiscal year 1945 to a grand total exceeding $5,600,000,000. The dairy co-ops alone did $1,300,000,000 of business. Those who think food manufacturing may be called big business can test their own operations against these totals. The result is likely to be a decision to study the technology as well as the merchandising practices of the cooperatives. In fact, some of the co-ops are said to have some of the finest modern food factories of any in existence.

SUGAR RULES TIGHTEN—The Department of Agriculture has redefined "liquid sugar" so that some of the sirups which formerly escaped rationing must now be counted in the sugar quota. The purpose of this kind of action is to make sugar control more definite and to make the distribution of sugar more equitable.

BUILDING LAGS—Washington continues to favor the veterans on all construction matters to the extent of complete interruption of most industrial building. Increased percentages of all important materials have been set aside for the housing program and a very large part of war surplus which might help is similarly restricted. This effort at veterans' aid is inevitable in an election year. But Washington does not expect any let-up for a long time to come. Already the vote-buying power of favors, which can be granted by Executive or Congressional action, overrides all other factors in judgment about Washington. Programs of industrial modernization and enlargement will suffer extensively.

BILLS DIE WITH CONGRESS—When Congress adjourned, expecting not to return until January, all pending legislation was killed. Bills part way through the legislative process must be re-introduced and run through all committee handling again, if they are to be voted on in the next Congress. This is more than usually significant, for 1947 will see a wholly new committee set-up under the new streamlining of Congress.



It is easier to handle and blend Monsanto Sodium Benzoate, U.S.P., in flake form. Unlike powder, Monsanto Sodium Benzoate flakes flow more freely—do not dust and cause annoyance to operators—do not ball when mixing. Ask for samples of Monsanto Sodium Benzoate, U.S.P., in flake and powder form. Try both, and see why flakes are preferred . . . Contact the nearest Monsanto Office, or write: MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri. District Offices: New York, Chicago, Boston, Detroit, Cincinnati, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.

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VODOL

Corn Oil Lecithin

STABILIZER • ANTIOXIDANT • EMULSIFIER *(as agent)*

Natural Phosphatide extract of corn oil, perfected by our process

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VODOL has rapidly gained a position of high preference among users of lecithins, from the largest to the smallest processors and producers. Reasons for this choice of VODOL are found in RESULTS THESE USERS HAVE ARRIVED AT, IN THEIR OWN TESTS AND COMPARISONS. The following qualities of VODOL are convincingly attested:

VODOL is absolutely neutral as to *Odor* and *Taste* in end use

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Instantly soluble at low temperatures. VODOL does not require pre-heating, pre-dissolving, straining nor thinning.

VODOL pours freely. Is easily handled. Disperses in liquid, solid, or semi-solid fats. When used in margarine, VODOL does not darken under normal frying temperatures.

VODOL IS AVAILABLE FOR IMMEDIATE SHIPMENT IN DRUMS OF 500 LBS., 50 LBS., AND 25 LBS. ★★★ SMALLER PACKAGES BY ARRANGEMENT.

Exclusive Product of

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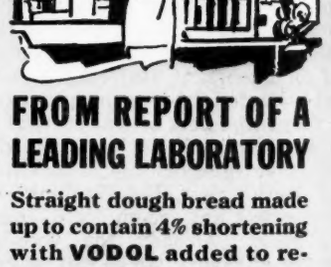


FROM REPORT OF A LEADING LABORATORY

Straight dough bread made up to contain 4% shortening with VODOL added to replace 1.5% of shortening.

Addition of VODOL gave softer loaf when fresh, and softer loaf 42 HOURS AFTER baking. Softness as revealed by test is expressed in Millimeters and represents compressibility of a slice under load in 10 seconds. The softer the bread, the greater the compressibility. Results:

Test for Freshness

Oven No.	1	2	3	Av.
Fresh: No VODOL	93	90	89	91
FRESH: VODOL	109	104	93	102
42-hr. old bread: No VODOL	26	26	33	28
42-hr. old bread: VODOL	42	47	48	45

MEN • JOBS • COMPANIES

INDUSTRY

The Borden Co. has acquired a milk plant at Columbus Grove, Ohio, formerly operated by Nestle's Milk Products, Inc. The present personnel at the Columbus Grove plant, headed by Superintendent E. J. Cranston, will be retained.

California Fig Institute has announced plans for a research department with headquarters and a laboratory in Fresno, Calif. Announcement was made by E. E. Wilcox, chairman of the research committee of the institute.

California Preserving Co., Los Angeles, expects to erect a $250,000 building near its present plant. New facilities will be used for increased manufacture of jams, jellies, preserves, apple butter and mincemeat.

Chase Candy Co., St. Joseph, Mo., has purchased the National Candy Co., a division of Clinton Industries, Inc., with plants in Chicago and St. Louis. Price is said to be in excess of $5,000,000. The three factories have a combined capacity to produce 75,000,000 lb. of candy annually. Clinton Industries will retain its corn refining plant.

Christie Brown & Co., Ltd., has purchased a 25-acre site near the Toronto end of the Queen Elizabeth Highway on which it will erect a new bakery, expected to be the largest in Canada. Alex A. Fraser is president of the company.

Del Paso Canning Co., has begun operation of its new $200,000 plant in North Sacramento, Calif. The plant is owned and operated by James R. Pullen and Harold von der Lieth, and will pack for the labels of individual buyers rather than market under its own name.

Globe Mills, West Coast division of Pillsbury Mills, has announced plans for a new flour mill, feed mill and grain elevator, in Los Angeles. The elevator will hold about 1,250,000 bu. and the flour mill and feed mill will have daily capacities of 6,000 cwt. and 300 tons, respectively.

Maxwell House, division of General Foods Corp., has announced purchase of buildings for $600,000, at Houston, Tex. Increased space will make it possible to manufacture other General Foods products at Houston.

Orgo Products Co., Los Angeles, has announced that it will start manufacture of an amino acid preparation. The company also repackages vitamins.

The Oxford Canning Co., Inc., Clinton, Ark., has begun production at its new plant in Clinton. Its capacity will be 100 cases of tomatoes per hour.

Pacific Exploration Co., Seattle, Wash., announces that work on the 8200-ton floating cannery, S. S. Pacific Explorer, a reconverted freighter, is being completed at a cost of more than $1,500,000. The ship will have a complete fish and crab processing and canning plant and a refrigeration unit that will handle 4,000 tons. Four beam trawlers will do the fishing when the ship enters tuna waters this fall and the Bering Sea next spring.

DR. BERNARD H. GILMORE

Holder of the Calgonizing Fellowship at Mellon Institute from 1933 to 1939, Dr. Bernard H. Gilmore has rejoined the research and product development staff of Calgon, Inc., Pittsburgh. In his new capacity, Dr. Gilmore will be concerned primarily with applications for Calgon in the food industry.

J. ROBERT LOCKE

Basic Food Materials, Inc., Cleveland, has completed a new plant in Oakland, Calif., and expects to begin operations this month. J. Robert Locke, now in charge of production at the Cleveland plant, will assume a similar position at Oakland.

Palmer Candy Co., Sioux City, Iowa, will erect a candy factory at Ontario, Calif. The brick and concrete structure will be one story in height and 100 x 300 ft. in area.

Pepsi Cola Bottling Co. of Los Angeles will erect a branch bottling plant in San Bernardino, Calif., as soon as building materials and machinery are available. Virgil D. Dardi is president.

Russell-Miller Milling Co., Minneapolis, Minn., has begun construction on a new plant in Alton, Ill., to replace the mill burned there on March 16. The building, expected to be completed by the first of next year, will have a capacity of approximately 1,000,000 lb. daily. Storage facilities will be available for 1,000,000 bu. of grain. Packing equipment for small packages of family flour, cake flour and other specialties will be installed. N. R. Mulroy is manager of the Alton plant.

The San Martin Vineyard Co., San Martin, Calif., has announced a 500,000 expansion program embracing plant additions, new machinery, and enlarged vineyard holdings.

Yosemite Winery Association has completed construction of 28 storage and fermenting tanks at its new 1,000,000-gal. plant near Madera, Calif. Malcolm Watson, cooperative manager, has announced that Leonard Berg will be winery superintendent.

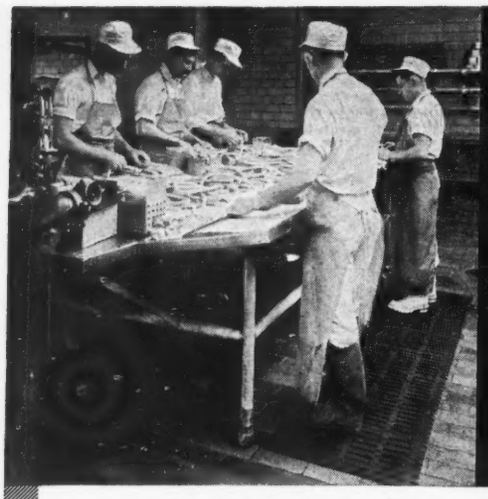
PERSONNEL

R. J. Anderson has been appointed chief engineer of Sheffield Farms Co., Inc., New York, to administer the accelerated postwar engineering program of the company.

Joseph T. Bay has joined the staff of Kitchen Art Foods, Inc., Chicago, as sales executive. He formerly was Chicago branch manager for The Best Foods, Inc.

Robert Bull, 2nd, is the new public relations director for the National Dairy Council, according to an announcement by Milton Hult, Dairy Council president.

August A. Busch, Jr., has been elected president of Anheuser-Busch, Inc.,



The ONLY Successful OIL and GREASE RESISTANT MATTING

Neo-Cord Counter-Tred

Contains no rubber
Made with Dupont Neoprene

TUF-TRED SUPERIOR GRADE TIRE FABRIC MATTING

A long-wearing mat that provides comfort and promotes safety in wet areas. Beveled nosing on all sides. ⅝" thick, up to 6' wide, any length.
Standard sizes: 16" x 24", 18" x 30", 22" x 36", 26" x 42".

AMERICAN Counter-Tred MATTING

A tough, durable, long-wearing rubber and cord matting with a resilient non-slip surface that affords safety in wet or slippery areas. Promotes sanitation. Ridged bottom affords aeration and drainage. Easily handled for cleaning. Adheres perfectly to the floor. Keeps the feet dry. ⅜" thick, 24" wide, any length.

AMERIFLEX Flexible Hardwood Link MATTING

Links are held on galvanized steel springwire framework. Lies flat. Follows contour of the floor. Beveled edges. Can be rolled or folded.

Write for prices and folder, "A Mat for Every Purpose", describing matting for promoting safety, providing comfort, reducing fatigue and furthering sanitation.

AMERICAN MAT CORPORATION
"America's Largest Matting Specialists"
1797 Adams Street • Toledo 2, Ohio

MORFLEX COUPLINGS
need no lubrication

Morflex couplings operate entirely without lubrication. No oil or grease to throw off and soil or contaminate. Special rubber trunnion biscuits permit some misalignment, cushion shock, isolate vibration, smooth operation. No metal-to-metal contact. Sizes from 2" to 12" diameter for various capacities.

MORSE CHAIN CO. • Detroit 8, Mich. • Ithaca, N.Y.
A Borg-Warner Industry

MORSE COUPLINGS and DRIVE SHAFTS

RAY ALBERTS

Formerly general manager of the dairy manufacturing plant of Telling-Belle Vernon Co., Wellington, Ohio, Ray Alberts has been appointed field director of the American Butter Institute, Chicago.

St. Louis, Mo., succeeding his brother, the late Adolphus Busch, III.

Dr. James E. Briggs has been named director of food nutrition for A. E. Staley Mfg. Co., Decatur, Ill., processor of corn and soybean products.

Thomas M. Davis recently was elected president of Felber Biscuit Co., Columbus, Ohio, succeeding A. T. Streitmann, now chairman of the board. Other officers include George H. Streitmann, vice-president, and Ray L. Woerner, treasurer.

Orrin Doell has been appointed Eastern division sales representative of C. L. Swanson & Son's, Omaha, Nebr.

Forrest H. Holz, of Decatur, Ga., has been elected executive secretary-treasurer of the Southern Wholesale Confectioners Association. Recently discharged from the Army, Mr. Holz is a graduate of Georgia Tech and served the association as assistant to C. M. McMillan, retiring executive secretary-treasurer.

Robert J. Keith has been appointed director of advertising for Pillsbury Mills, Inc., according to an announcement by H. W. Files, vice-president. Mr. Keith has been advertising manager of the company since 1943.

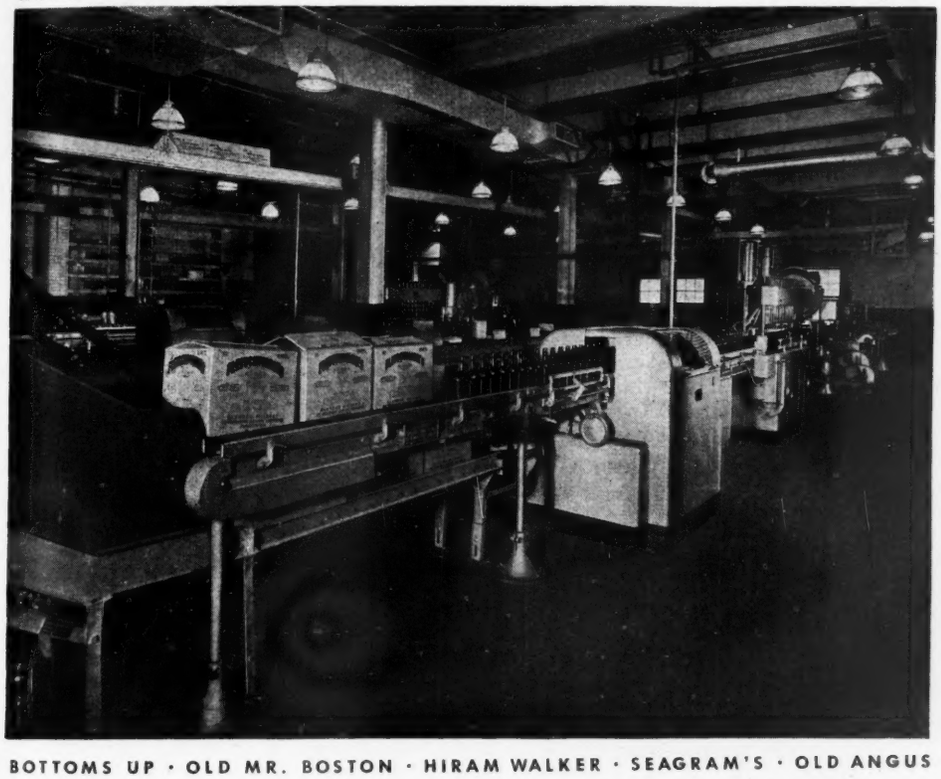
Bryce S. Landt, treasurer of American Dairy Association of Wisconsin, has been appointed chairman of the new American Dairy Association administrative committee. The committee includes D. T. Carlson, secretary, Northwest Ice Cream Manufacturers, Wilmar, Minn.; Dr. Robert Prior, manager and treasurer of Washington State Dairy Products Commission, Seattle, Wash.; C. R. Schoby, chair-

IN WINES AND LIQUORS THE NAMES THAT COUNT

...count on PNEUMATIC!

Here is a partial list:—

ROMA · PETRI · SAN MARTIN · LA SALLE · VIRGINIA DARE · MONTE CASSINO



Complete automatic line of Pneumatic equipment including machines for cleaning, filling, capping and labeling, operating in the Fleischmann plant at Peekskill, N. Y.

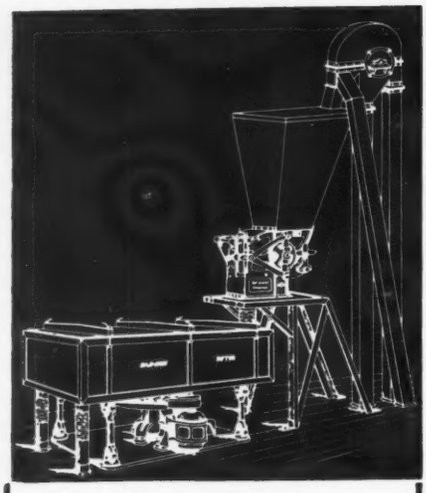
BOTTOMS UP · OLD MR. BOSTON · HIRAM WALKER · SEAGRAM'S · OLD ANGUS
SOUTHERN COMFORT · GILBEY'S · CINZANO · SCHENLEY'S · MINUTE MAN RUM

Name your brand and it's a pretty safe assumption a Pneumatic machine had a prominent part in cleaning, filling, labeling or capping the familiar bottle it comes in. In fact a number of leading wineries and distilleries use complete lines of Pneumatic equipment.

For over fifty years Pneumatic has led the way in meeting the mass production needs of the packaging field. This long experience has provided an engineering and manufacturing knowledge and background at Pneumatic second to none in the field. Because they are more sound in design, more precisely and substantially constructed, Pneumatic machines operate at "lower cost per container." That's why they are so widely preferred—why you will find Pneumatic bottling machinery your best choice, too. . . . PNEUMATIC SCALE CORPORATION, LTD., 91 Newport Avenue, North Quincy 71, Massachusetts; Branch Offices in New York, N. Y.; Chicago, Illinois; San Francisco, California; Los Angeles, California.

PNEUMATIC **PACKAGING AND BOTTLING MACHINERY**

Over eighty different machines for the packaging of dry, free-flowing products and the cleaning, filling, capping and labeling of containers for liquids and semi-liquids



IS YOUR INSTALLATION AS EFFICIENT AS YOUR SIFTER?

BAR-NUN ROTARY SIFTERS combine the sturdiness, compactness, large capacity, and versatility necessary to give maximum efficiency in sifting or grading operations. And Gump Engineering Service assures you that the Gump Equipment you select is installed to operate at its maximum efficiency. Illustrated above is one method of installing a BAR-NUN Sifter with a capacity regulating DRAVER FEEDER when an elevator is needed. Detailed information about Gump Engineered Equipment will be sent promptly upon receipt of complete information regarding your requirements.

B. F. Gump Co.

Established 1872

454 South Clinton Street Chicago, Ill.

man, Iowa Dairy Industry Commission, Bode, Iowa, and W. J. Swayer, president, Pure Milk Association, Chicago.

Ellis S. Lowinger has resigned as technical engineer in charge of the food starch sales division of National Starch Products, Inc.

A. R. McGregor, with Swift & Co., since 1930, has been appointed assistant district manager in the Atlanta, Ga., territory. He will assist in supervising operations in Swift's 28 branches in Alabama, Georgia, Tennessee and Florida.

C. M. McMillan, Atlanta Trade Association executive, has accepted the appointment as executive secretary of the National Candy Wholesalers Association, Inc., with headquarters in Washington, D. C.

Henry S. Parker, formerly vice-president of the Beaufort Chemical Corp., Beaufort, N. C., is president of the newly organized Sperti Foods, Inc., a wholly owned subsidiary corporation of Sperti, Inc., Cincinnati. The new company will take over the food and food machinery division of the Sperti Organization, including the yeast division.

Maj. Lyle M. Richardson, formerly with the ration development branch of the Quartermaster Subsistence and Development Laboratory, Chicago, is now technical salesman for Beatrice Foods, Chicago.

DEATHS

William J. Budgell, 83, retired buyer and superintendent of the John P. Squire Co. packing plant, Somerville, Mass., September 1.

Adolphus Busch III, 55, president of Anheuser-Busch, Inc., St. Louis, Mo., August 29.

A. Hamilton Cooke, 70, vice-president of Atlantic Coast Fisheries Co., New York, and a director of the Brooklyn Bridge Freezing and Cold Storage Co, August 19, at Mineola, N. Y.

William J. Luer, 59, president of Luer Bros. Packing Co., Alton, Ill., August 11.

John Read, 62, research chemist of Beatrice Creamery Co., and former head of the department of chemistry and physics, University of Arkansas, August 22.

Stephen M. Ryder, 88, head of Chisholm-Ryder Co., Niagara Falls, N. Y., August 31.

John B. Spatz, 81, one of the founders and chairman of the Board of Perfection Biscuit Co., Fort Wayne, Ind., August 29.

Silicone News

DC SILICONES

DC Antifoam A—*recently developed silicone foam killer useful in many industries.*

". . . the most generally useful and effective foam killer we have ever tested

DC Antifoam A in concentrations of 70 parts per million prevents foaming of rosin soap solutions.

When DC Antifoam A was first introduced, laboratory tests had indicated its ability to kill foam in a variety of aqueous solutions and emulsions even during steam distillation and vacuum evaporation. Since then it has been found effective in many laboratory procedures and in many plant operations.

DC Antifoam A in very low concentrations is now used to prevent foaming:

In Adhesives
In the Varnish and Lacquer Industries
In the processing of pharmaceuticals
In the distillation of alcohols
In the Rubber Industry. Specifically in the concentration of GRS., Neoprene and butadiene—styrene copolymers.

TYPICAL OF MANY REPORTS RECEIVED—"We are using DC Antifoam A in a vacuum concentration of an alkaline aqueous protein solution. One ounce of DC Antifoam A replaces about 2 gallons of the foam inhibitor previously used and eliminates about ten man-hours of labor previously required to control the process."

Additional Data about DC Antifoam A is contained in leaflet No. O 6-1.

Also of interest to plant operating officials are the Dow Corning Silicone Greases for the lubrication of bearings operating at abnormally high or low temperatures. Ask for data sheet No. O 7-1.

DOW CORNING CORPORATION
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Chicago Office: Builders' Building
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In Canada: Dow Corning Products Distributed by Fiberglas Canada, Ltd., Toronto

Dow Corning
FIRST IN SILICONES

WITH AN ANCHOR CAP

. . . "C.T." stands for a lot of things

WITH the Anchor C. T. Cap the initials technically mean "continuous thread" . . .

But they could stand for a lot of other things—"completely tight", for example. Anchor C.T. Caps provide a dependable airtight, leakproof seal because, in application, the cap thread contacts only the underside of the glass thread, exerting an even, downward sealing pressure on the liner around the complete circumference of the container finish.

A more broadly rounded thread gives Anchor C. T. Caps greater limits of tolerance and eliminates friction in application, removal and reseal. The positive knurling holds the liner in place—it can't drop out yet isn't wedged in the cap.

And "C. T." might stand for "closely tested". For it's a fact that Anchor C. T. Caps are regularly gauge tested for accuracy of manufacture. That, too, means uniformly tight and dependable seals.

Tune in "Crime Photographer" every Thursday evening, entire Coast-to-Coast Network, CBS.

Anchor
CONTAINERS and CAPS

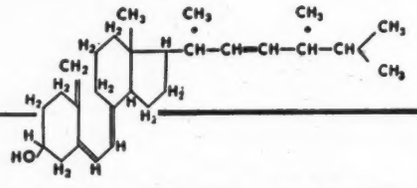
PRODUCTS OF
ANCHOR HOCKING GLASS CORPORATION
LANCASTER, OHIO

YOU SHOULD ADOPT

Calciferol

(PURE CRYSTALLINE VITAMIN D_2)

Calciferol is the name applicable *only to the superior, pure crystalline product* as so recognized and used throughout the world.



WRITE FOR DETAILS AND NEW LOW PRICE SCHEDULE

Winthrop's pure crystalline synthetic vitamin D_2 (Calciferol) is free from lumisterol, toxisterol, suprasterol, and other by-products of irradiation. It never varies in antirachitic potency.

OTHER WINTHROP PURE SYNTHETIC VITAMINS:

- **TRIDEE**—Winthrop's Brand of vitamin D_3 in Corn Oil
- **VITAMIN B_1** (Thiamine Hydrochloride)
- **VITAMIN B_2** (Riboflavin)
- **NIACINAMIDE**
- **VITAMIN B_6** (Pyridoxine Hydrochloride)
- **CALCIUM PANTOTHENATE**
- **VITAMIN C** (Ascorbic Acid)
- **AMINO-ACIDS**

Valine	Glutamic Acid
Cystine	Tryptophane
Tyrosine	Phenylalanine
Leucine	Methionine

- **"B-E-T-S"**—Winthrop's Brand of Bread-Enrichment Tablets
- **"VEXTRAM"**—Winthrop's Brand of Flour-Enrichment Mixture

POTENCIES AND PACKINGS:

Crystalline Form in vials of one, five, and ten grams.

Solution in Corn Oil: 1,000,000 U.S.P. Units per gram* packed as follows:

400 Standard Units	2,500 Standard Units
1,000 Standard Units	50,000 Standard Units

Also Solution in Corn Oil: 400,000 U.S.P. Units per gram packed as follows:

250 Standard Units	1,000 Standard Units
500 Standard Units	20,000 Standard Units

*Standard Unit=1,000,000 U. S. P. Units

WINTHROP

For prices and information address
Special Markets Division
WINTHROP CHEMICAL COMPANY, INC.
170 Varick Street, New York 13, N. Y.

ASSOCIATED INDUSTRIES

Celanese Corp. of America has made known the appointment of Wallace W. Hoge as assistant treasurer. Mr. Hoge joined the corporation in March, 1945, and prior to that was associated with Morgan Stanley & Co.

Chisholm-Ryder Co., Inc., Niagara Falls, N. Y., at a recent special meeting of the board of directors, elected Capt. Norman R. Stiles, president and treasurer to fill the vacancy caused by the death of Stephen Morse Ryder. Captain Stiles formerly was assistant to the president of Chisholm-Ryder.

Container Testing Laboratories, Inc., has opened an office in Los Angeles, according to an announcement by E. A. Throckmorton, president. The office will be under the direction of Lee M. Smith, for many years associated with the Fort Wayne Corrugated Paper Co. The new address is, 9047 Wilshire Blvd., Beverly Hills, Calif.

Dent Engineers, consultants and designers, formerly located in Joliet, Ill., has shifted its headquarters office to San Francisco.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has announced the retirement of Ewing Hymers, sales manager of the standard products section of the ammonia department. Louis G. Seebach, assistant sales manager, will succeed Mr. Hymers, who has been concerned with the production or sale of ammonia and its compounds for nearly 50 years.

The Greenbrier Co., manufacturer and distributor of poultry processing equipment, with headquarters in Cleveland, has announced the appointments of Harry G. Brooks as sales manager of the company, and Ward E. Culp, eastern division manager.

Package Machinery Co., Springfield, Mass., announces that Bob Strehlau of the Springfield office, will replace Fred Taylor, who has resigned as manager of the Cleveland office. Joe Kelly will replace Mr. Strehlau. The company also recently announced its acquisition of the Pratt & Whitney plant in East Longmeadow, Mass., from the War Assets Administration. Purchase price was $1,750,000. Newly acquired machines will be added to existing equipment and the number of employees is to be increased from 650 to an expected 900 within a year.

H. K. Porter Co., Inc., has announced its acquisition of the Drake Equipment & Supply Co., Chicago, manufacturer of brake parts for railway locomotives and freight cars and air brakes for export.

Her taste tells her when frozen foods have lost their flavor and moisture through wraps with high MVT . . . high *moisture-vapor transmission.*

Alcoa Aluminum Foil provides a metal barrier to moisture—prevents drying out of frozen fruits, vegetables, meats, and other produce in storage. Flavor and goodness are sealed in *tight* when Alcoa Aluminum Foil package structures are heat-sealed.

Aluminum foil can be laminated to all types of supporting papers and synthetic sheets to provide a package structure of maximum strength, consistent with formability. And because Alcoa Aluminum is friendly to food, most produce can be packed in direct contact with the foil without danger of staining, or developing strange tastes and odors.

Leading converters of packaging materials are experts at laminating Alcoa Aluminum Foil to produce almost any wrapping combination you require. Let them work with you on aluminum foil bags, bags in cartons, and other packages for frozen foods. We'll be glad to furnish the names and addresses of these experts. ALUMINUM COMPANY OF AMERICA, sales offices in leading cities, or 1845 Gulf Building, Pittsburgh 19, Penna.

ALCOA ALUMINUM FOIL

FOOD EQUIPMENT NEWS

Mechanical vacuum cranberry picker.

Cranberry Picker

A MECHANICAL cranberry picker that operates on the principle of a vacuum cleaner and is capable of picking berries more than twice as fast as a field hand, is announced by Cranberry Canners, Inc., Dept. I, Hanson, Mass.

The machine picks berries very clean, the chaff being thrown out of the side of the machine. The hopper, which is square on the outside, is round on the inside and is lined with sponge rubber. As the berries are sucked up by the hose, they whirl into the circular bin and roll down to a box at the bottom. The chaff is blown out one side of the machine so that there are no leaves or vines mixed with the berries.

Fork Truck Attachments

ELWELL-PARKER ELECTRIC CO., Dept. I, Cleveland, Ohio, has designed a simple attachment that converts a fork truck into an articulated load carrier. In one particular application of this attachment one operator of the truck, with one helper to guide the load at sharp turns, was able to load freight cars in a shorter time than that taken by five men. Truck and attachment form an articulated handler, adaptable not only to loading freight cars. but for transporting and tiering heavy, bulky objects anywhere in narrow aisles with right angle turns.

One part of the attachment is a small turntable bolted to the truck's lower forks. This supports the load. An overhead fork is bolted to the lower fork's rear framework and is adjustable for height of load. A chain extends from the outer end of the upper fork, and a hooked clamp on the end of the chain fits down over the edge of the load. When the slack of the chain is taken up, the load is held firmly in position.

The attachment is readily applied. By the removal of a few bolts, it is released, freeing the truck for any work not requiring the device.

Electric Hygrometer

FOR high precision humidity measurement and control the American Instrument Co., Dept. I, Silver Spring, Md., announce their "Aminco-Dunmore Electric Hygrometer." It can be successfully applied to measurement of humidity, measurement of soil moisture content, studies of moisture in concrete, and water vapor permeability studies. The instrument employs a sensing element which is compact, precise and instantly responsive to microchanges in relative humidity.

It gives reproductible readings throughout the entire standard dry-bulb temperature range of 40 deg. to 120 deg. F. and relative humidity range of 7 percent to 100 percent. Microchanges within plus-minus 0.5 percent relative humidity are instantly sensed, indicated or recorded within the standard temperature range.

This electric hygrometer does not add moisture to or remove it from the space whose moisture content is being measured or controlled.

Insecticide Dispenser

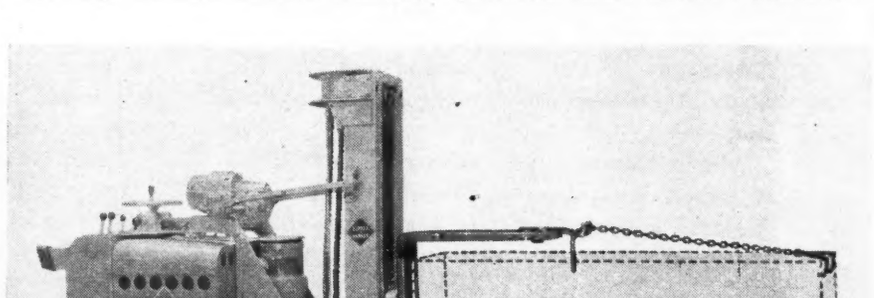
A COMPLETELY automatic insecticide dispenser that will kill flying insects in areas of 500,000 cu.ft. is announced by the West Disinfecting Co., Dept. I, 42-16 West St., Long Island City 1, N. Y. The "Hydro-Mist" unit requires filling with "Vaposector Fluid," setting time clock and plugging into either AC or DC outlet. It will completely and automatically dispense the insecticide in a vapor mist without any further attention.

Variable Speed Selector

A DEVELOPMENT of planetary motion in which standard cross-section V-belts and four variable pitch pulleys provide infinite ratio, stepless speed from full down through zero and into full reverse at constant torque of 2 hp. capacity is jointly announced by Speed Selector, Inc. and The B. F. Goodrich Co., Dept. I, Akron, Ohio. The unit will be known as the "Variable-V-Planetary Speed Selector."

A slight change in the variable pitch pulleys of the speed selector brings a large change in output speed through the multiplying action of the planetary mounted on the motor or driven shaft of the machine on which it is used, eliminating need for special mounting brackets or extra guards.

In operation the unit system compares the ratios of two V-belt drives



Fork truck attachment.

and applies the difference in speed to output shafts. With the ratios equal the difference in speed and output shaft speed is zero. If the ratio of one drive is greater than the other the output shaft rotates forward at a speed proportional to the difference in ratios. If the ratio is less the output shaft operates in reverse in the same proportionate ratios. Speeds from 400 r.p.m. to zero, forward and reverse can be obtained. All changes are made by a hand control wheel, which alters the pitch diameter of the center pulleys.

Pump Booster

A PUMP booster which makes available heretofore inaccessible water supplies is announced by Jet Pump Division, Derbyshire Machine & Tool Co., Dept. I, 5215-U Belfield Ave., Philadelphia, 44. The unit employs the jet pump principle, weighs but 18 pounds, and has no moving parts.

It operates by running two 2½ in. soft hose lines from the pumper to the unit which is submerged in the water supply. When the pumper takes suction after priming, the driving water going through the jet entrains additional water which is returned to the suction side of the pumper. This additional water is available for fire fighting.

Using standard fire pumping equipment or its equivalent, the pump booster will lift water vertically 100 ft. or more, and will draft water for a distance of 200 to 300 ft. from water sources impossible to reach because of gulleys, ditches, mud or other obstacles.

Bag Making Machine

AN AUTOMATIC bag making machine that will make up to 5000 bags per hour and sealed throughout, with automatic feed from roll stock, is announced by Shumann Equipment Co., Dept. I, Pittsburgh 10, Pa. It can handle many heat-sealing materials such as cellophane, pliofilm, foil, glassine, etc. Bottoms of bags are crimped instead of folded and are absolutely moisture-proof and sift-proof. The heat controls consist of thermostats and rheostats which automatically maintain the desired temperature at all times.

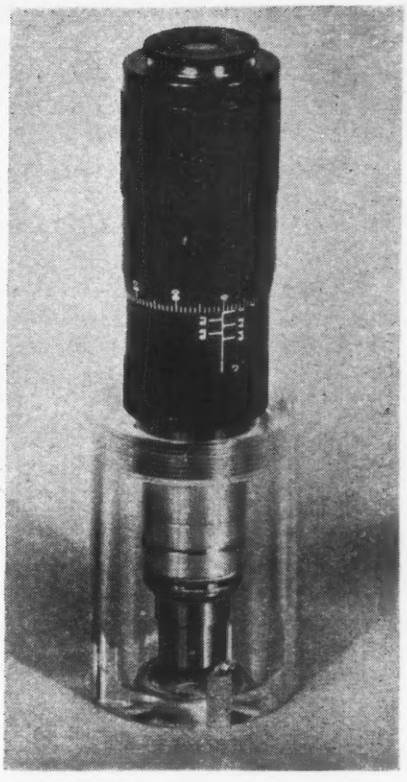
Hinged Conveyor

A HINGED section for use in a permanent gravity conveyor line is being produced by the Rapids-Standard Co., Inc., Dept. I, Grand Rapids, Mich. It finds its principal use in bridging an aisle-way for passage of personnel, trucks or equipment by providing 36 in. maximum open passage-way through a conveyor line. The section is opened by lifting the movable part, swinging it upward and back until it rests securely on the stationary section.

Optical Micrometer

THERE is difficulty in gaging the central portions of large sheets of transparent plastics and glass since they are inaccessible to ordinary micrometers. To overcome these troubles the Aireon Manufacturing Corp., Dept. I, 166 West Olive Ave., Burbank, Calif., has developed an optical micrometer which consists essentially of a microscope that can be screwed up or down in an outer tube.

The measurement consists in sharply focusing a crayon mark on the sheet in the microscope. This immediately gives the thickness of the sheet in about the same time that would be required with a purely mechanical instrument.

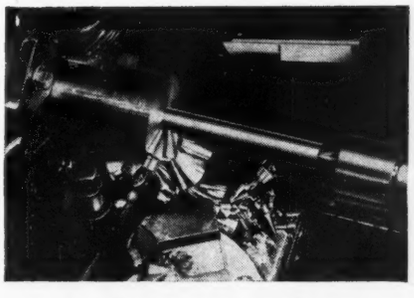


Optical micrometer for transparent materials.

Shearcutting Tools

A PRE-SHARPENED tool bit that cuts metal with a knife-like action instead of chiseling it off, is announced by the Fearless Tool Co., Dept. I, 1234 South Gramercy Place, Los Angeles 6, Calif. The "Shearcutter" is said to take cuts two to three times its nominal size and greatly reduces production time and cost. Digging in and chattering are prevented by the scientifically presharpened cutting edge of the tool bit.

This same cutting tool may be used on copper, brass, bronze, plastics, cast iron, steel and other ferrous and alloys without changing the original grind.



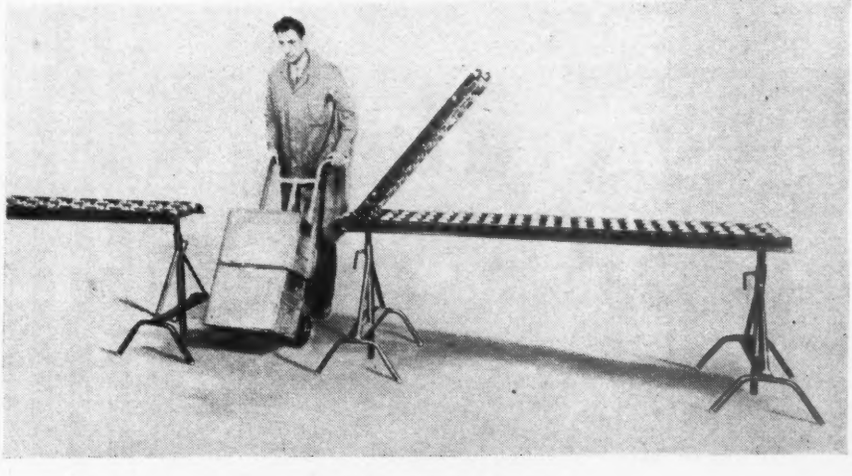
Shearcutting tool bit.

Specialty Steels

THE JESSOP STEEL Co., Dept. I, Washington, Pa., announces that in collaboration with the Barium Steel & Forge Co., Inc., it has developed a new method of processing high speed steel rounds in diameters greater than five inches. These are free from the usual central carbide segregation that is common to high speed steels.

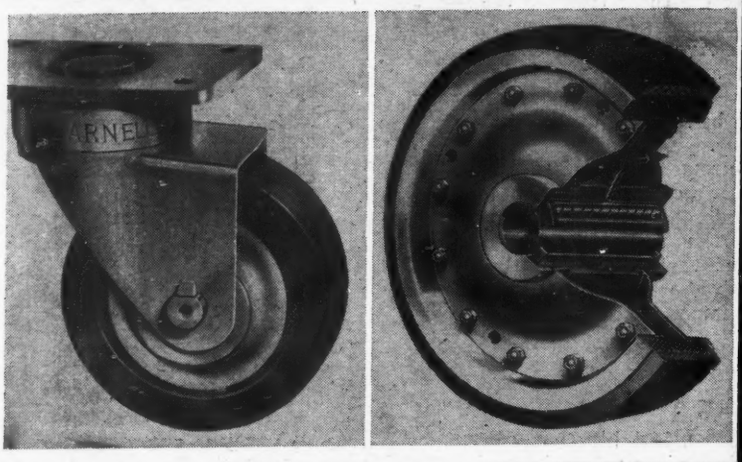
Tungsten Carbide Rounds

SOLID extruded tungsten carbide rounds in two grades with a Rockwell hardness of 89.0 and 91.0, respectively, are announced by Kennametal, Inc., Dept. I, Latrobe, Pa. These rounds have been developed primarily for use as wear-resistant elements and are



Hinged conveyor section.

Time Tested



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CASTERS & WHEELS

All Darnell Swivel Casters feature a DOUBLE BALL-BEARING SWIVEL HEAD —assuring the easiest handling of the heaviest loads on any type floor.

A SAVING AT EVERY TURN

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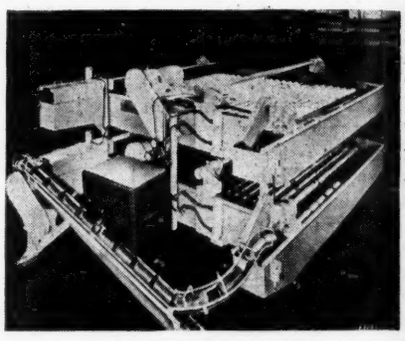
36 N. CLINTON, CHICAGO 6, ILL.

suitable for such applications as guides, feeding fingers for automatic machines, rollers, thread checking wires, etc. They are available in diameters ranging from 1/32 in. up to ¼ in. in 1/32 in. intervals in standard lengths, in even inches, of from 1 in. to 10 in.

Can Cooler

A CAN cooling unit,* called "Rex Thermo-Roto" for cooling sealed cans after they have been processed for such products as tomato juices, soups, etc., is announced by Chain Belt Co., Dept. I, 1600 W. Bruce St., Milwaukee 4, Wis.

The process involves very rapidly rotating the can, partially submerging it in a counterflow of cooling water, creating a turbulence of the can contents, and as the cans progress through the machine, fresh portions of the contents are constantly brought in contact with the container wall.



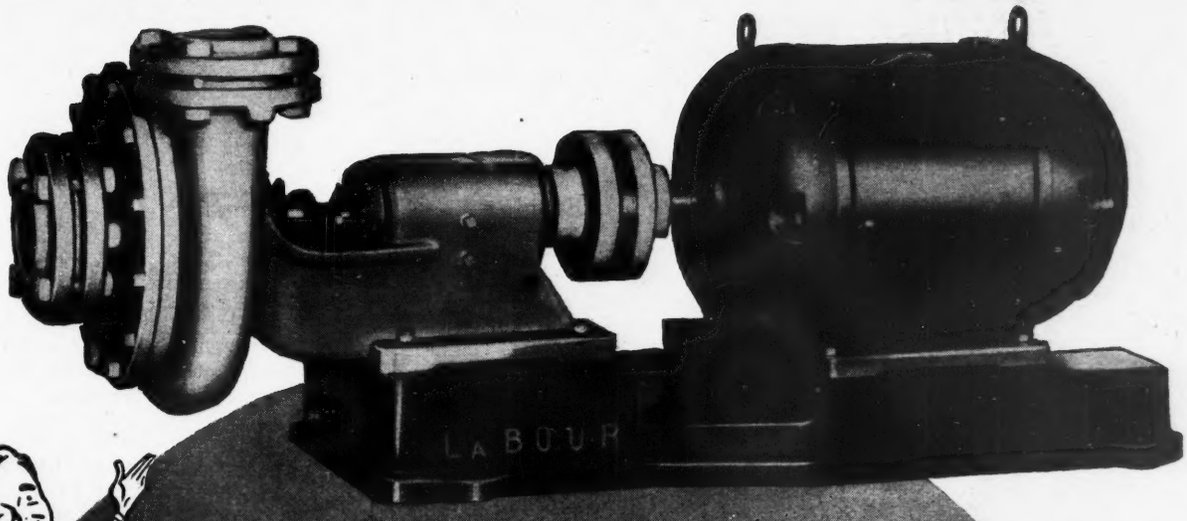
Continuous can cooler.

This action achieves the maximum heat transfer efficiency, as well as shortening the cooling time cycle. The operation is continuous and checks over-cooking, which in turn affects the texture, color and taste of the product.

The Rex Thermo-Roto can also be adapted to the heat-processing of liquid acid foods. The temperature of can content can be quickly raised to a range of 205 to 208 deg. F. usually within 3 to 4 min. The machine may also be had with two decks; the upper deck as the heater and the lower as a cooler, or both decks serving the same purpose.

Plastic Slide Rule

BINDING or sticking of the slide under varying atmospheric conditions is said to be impossible in the new plastic 10-in. slide rule brought out recently by Charles Bruning Co., Dept. I, 4754-10 Montrose Ave., Chicago 41, Ill. Remarkable dimensional stability is claimed for the new material and it is said that the precision graduations are unaffected by temperature changes. The glass indicator is mounted in a polished stainless steel frame which holds it firmly in place. The beveled edges of the rule are graduated in inches and centimeters



Well, yes and no...

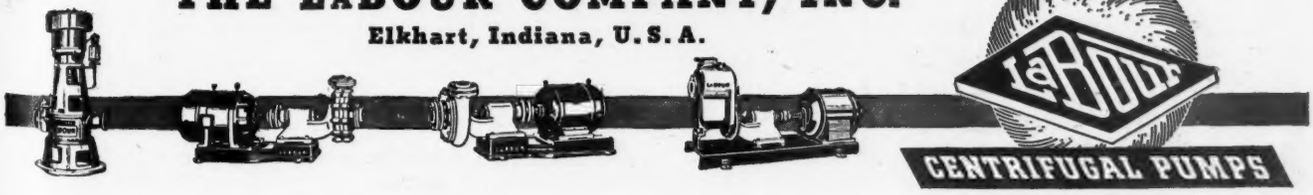
Strictly speaking, LaBour Type Q is classed as a non-priming centrifugal pump. Yet under certain conditions it will prime itself. That's an important fact in many process plant applications.

To be classed as self-priming, a pump must be able to handle 100% air or vapor under high suction lift. LaBour Types G and D will do this. LaBour Type Q, however, can handle about 20% air or vapor mixed with liquid for a protracted time, and it can take and dispose of brief 100% gulps, thus priming itself completely under some low suction lift conditions.

The result is a highly efficient, "non-priming" centrifugal pump which has high air handling ability under many conditions. Type Q, like the rest of the LaBour family of pumps, is repeated proof of a long-established fact — if you need a LaBour, nothing else will do.

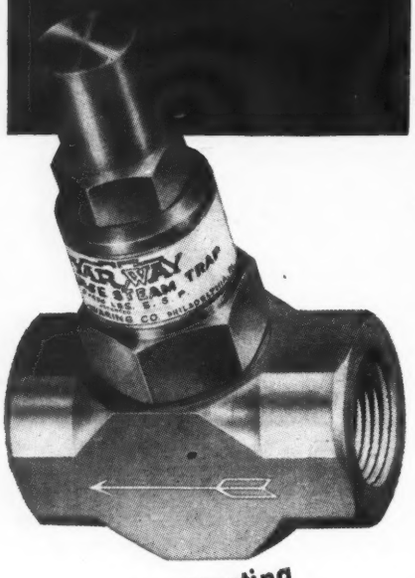
IF YOU NEED A LABOUR NOTHING ELSE WILL DO

THE LABOUR COMPANY, INC.
Elkhart, Indiana, U.S.A.



LaBOUR
CENTRIFUGAL PUMPS

Good for
ALL
PRESSURES
without change
of Valve or Seat



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- Small Size
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- One Moving Part
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127 Mermaid Avenue, Phila. 18, Pa.

YARWAY
IMPULSE
STEAM TRAP

and the scales include the conventional A, B, CI, C, D, K, S, L and T scales. The tension on the slide is readily adjustable by four screws on the back of the rule.

Jaw Crusher

NOVEL principles that are said to result in extremely high efficiency compared with conventional jaw crushers have been incorporated in the design of the new Simplex single-jaw crusher announced by Straub Mfg. Co., Dept. I, 507 Chestnut St., Oakland 7, Calif.

Fire Hose

AMERICAN-LAFRANCE-FOAMITE CORP., Dept. I, Elmira, N. Y., announces an "all weather" line of water repellant, mildew resistant fire hose, which is made exclusively for American-LaFrance by the Goodyear Tire & Rubber Co. It is built to withstand the abrasive action of gravel, cinder or rough surfaces over which it may be dragged. It will withstand extreme temperatures from freezing cold to blistering heat.

Worktable and Sealer

A COMBINATION worktable with conveyor belt and rotary sealer is announced by Doughboy Industries, Inc., Dept. I, New Richmond, Wis. This combination will seal up to 85 bags per minute. The table is 30 in. high, 6 ft. long and 3 ft. wide, with a steel frame and plastic top. The conveyor belt is 3 in. wide, adjustable and motivated by a $\frac{1}{6}$ hp. motor. The sealing rolls and the belt travel at the same relative speed.

The combination operates continuously. After the bags have been filled they are placed in the conveyor trough, which carries them to the sealing rolls.

Diffusion Pump

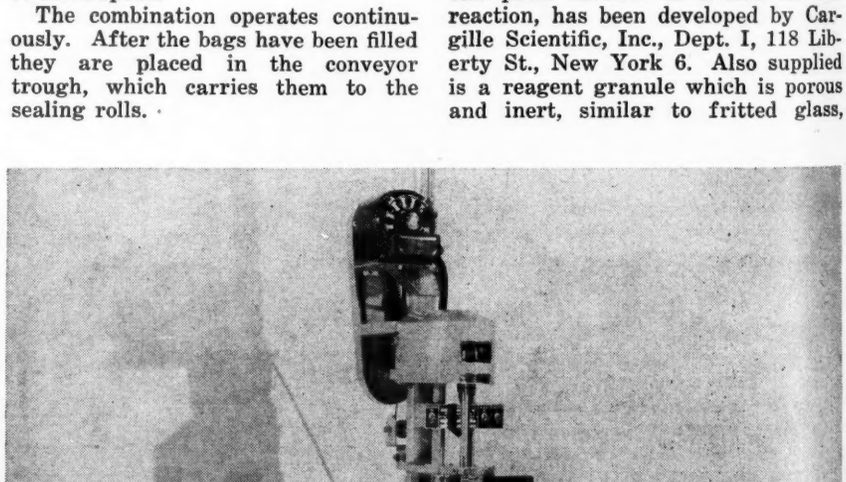
NATIONAL RESEARCH CORP., Dept. I, 100 Brookline Ave., Boston 15, Mass. announce the H-10 all-metal 10 in. diffusion pump with a capacity of 3,000 CFM from 2×10^{-3} mm. to 10^{-5} mm. of mercury. It operates against a forepressure of 450 microns and blanks off at 10^{-6} mm. of mercury. Outgassing and corrosion are minimized.

Hydraulic Unit

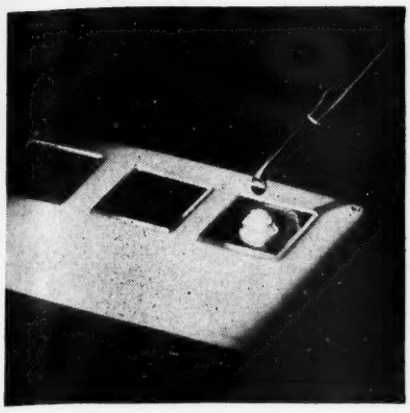
DEVELOPED for hydraulic power takeoff on tractors, and now available for a variety of industrial uses, is the Roper-Pac, a hydraulic power unit introduced by Geo. D. Roper Corp., Dept. I, Rockford, Ill. The device is not much larger than an automobile storage battery and includes within one casing the rotary gear pump, control valves and a 2-gal. oil reserve. The shaft can be connected to an electric motor or gasoline engine to drive the pump. The pump delivery is connected by means of a pipe to a hydraulic cylinder which is moved by pump pressure to lift a load or perform other useful work. A control shaft extending from the casing determines by its position what portion of the stroke cycle will be accomplished, held in the raised position, lowered, or the device reset for the next cycle. Pump delivery is 6 g.p.m. at 500 r.p.m. or 13 g.p.m. at 1,000 r.p.m. for 400 lb. per sq. in. pressure.

Mirror Spot Plate

A SPOT testing plate furnished with mirrors instead of the conventional test plate cavities as a site for the reaction, has been developed by Cargille Scientific, Inc., Dept. I, 118 Liberty St., New York 6. Also supplied is a reagent granule which is porous and inert, similar to fritted glass,



Combination worktable, conveyor and sealer.



Spot testing plate and reagent granule.

throughout which is dispersed a pure, dry chemical reagent soluble in the liquid to be tested. When two or three drops of the liquid flow over the granule, the reagent is instantly dissolved and as the liquid spreads over the mirror, any precipitate shows up clearly. Minute traces of precipitate scatter the light passing to and from the mirror, and this diminishes the brilliance of the mirror. This effect shows up precipitates that are only 1/40 the minimum quantity visible on the conventional plate.

Cover Support

ACCESS to pressure vessels of all kinds through manhole openings is facilitated by a new dual swing support for the manhole cover which has recently been introduced by Lenape Hydraulic Pressing & Forging Co., Dept. I, P. O. Box 23, West Chester, Pa. Ordinarily, supports for manhole covers swing the cover inward only. The new support, use in conjunction with Lenape standard elliptical manhole covers, permits such covers to be manipulated and withdrawn through the opening and swung aside so as to be out of the way. Covers so equipped are available in standard sizes for 10x15 to 18x24 in. manholes, for use wherever manways are required for frequent access. Covers are made in carbon and stainless steels.

Operation Recorder

FOR PROCESS timing and time study work the Ess Instrument Co., Dept. I, Bergenfield, N. J., has introduced an operation recorder that provides a continuous record of "time on" and "time off" of multiple operations. The instrument can be supplied with a single-acting pen, a two-position double-acting pen, or a three-position pen, while as many as six single- or double-acting pens can be combined on a single chart. Double-acting pens are now being used in this company's "Normality Indicators" which are used to record the operation of a variety of kinds of indicator. When operation is normal a circle is traced. If the process goes too far in one direction the pen moves outward and remains

A BETTER Strainer to "police your pipelines"

- **FIRST**—*The Screen,* a high-grade woven Monel wire basket that catches solids—lets condensate, oil or other fluids flow freely.
- **SECOND**—*Finish.* Cadmium plated for protection against corrosion and for better appearance.
- **THIRD**—*Easily Cleaned.* Blow-off bushing made for easy removal. Bushing and Screen come out together. Screen automatically aligns on reassembly.
- **THOUSANDS IN SERVICE**—Sold by over 100 Mill Supply Houses.

6 sizes from ½" to 2" for pressures up to 600 lb. Reasonably priced. See your supply house or write for Bulletin S-201.

YARNALL-WARING COMPANY
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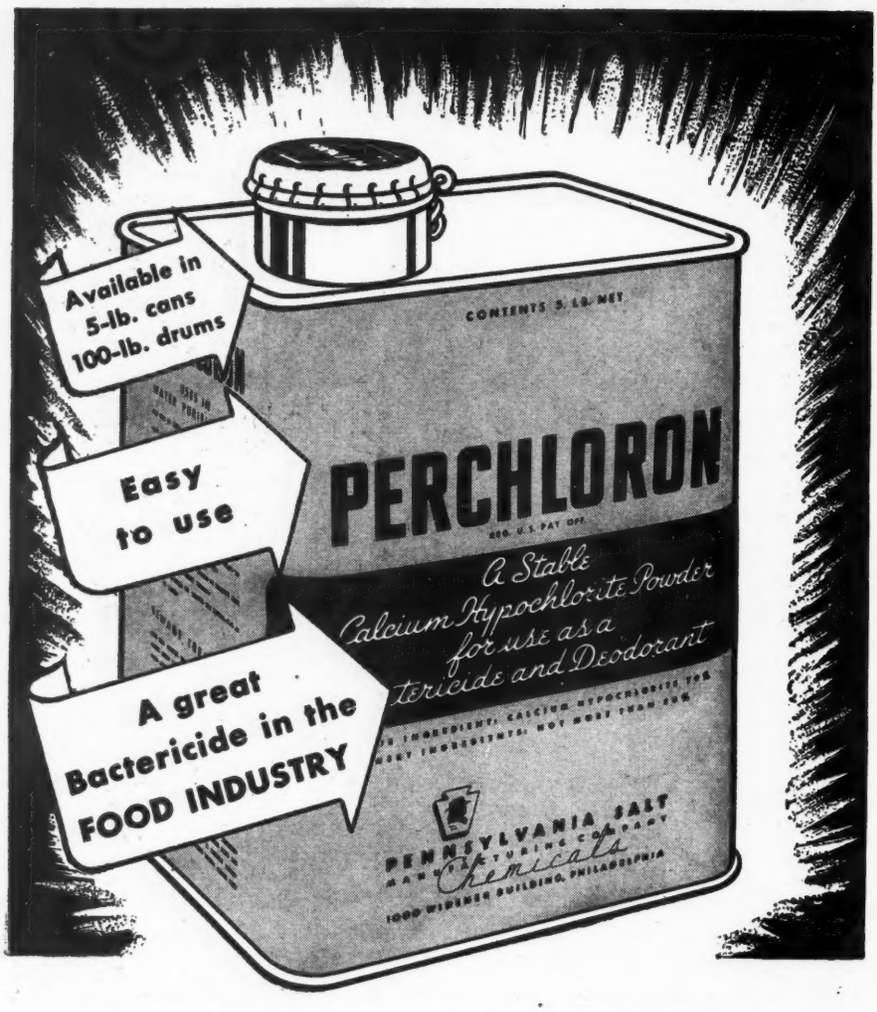
YARWAY STRAINERS



PERCHLORON is a desirable source of chlorine, quick acting and not injurious to metals, at recommended concentrations. Perchloron will not impart odors or flavors to food products which contact sterilized utensils.

AS A BACTERICIDE, PERCHLORON IS USED IN:

- Milk separators and ice cream freezers
- Cream and cheese factory utensils
- Preserving, baking and candy-making utensils
- Bottle washing equipment
- Cannery equipment
- Tanks and tank cars
- Tables, shelves and floors

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there until "normal" is resumed, when the pen returns to the center point. If the process goes too far in the other direction, the pen moves to the other side of "normal" and remains there as long as the condition persists. As many as six of these three-position "Normality" pens can be placed on a single chart to give a complete picture of the "normality" of six processes simultaneously.

All Steel Conveyor

CONVEYORS with gloss finish table top, corrosion and acid resisting, all steel, with all moving parts inclosed, are announced by Duane Machinery Corp., Dept. I, 51 Franklin St., New York 13. They are built with either permanent or portable variable speed motor drive and come in standard size lengths of sections 8, 10 and 12 ft. Sections can be joined to any desired length. Belt rides on smooth solid base and returning belt rides on ball-bearing rollers and is completely inclosed.

Transfer Valve

THIS COMPANY'S "A" Metal, a tough, dense metal of uniform grain and high endurance limit, is used in the new 125 lb. single-vane, quick-operating, four-way transfer valve recently announced by R-S Products Corp., Dept. I, Wayne Junction, Philadelphia 44, Pa. The valve is designed to transfer oil, pulp, water and other materials from one line to another, either manually or under automatic operation. Types are available for a wide range in pressure and in sizes from 4 to 72 in.

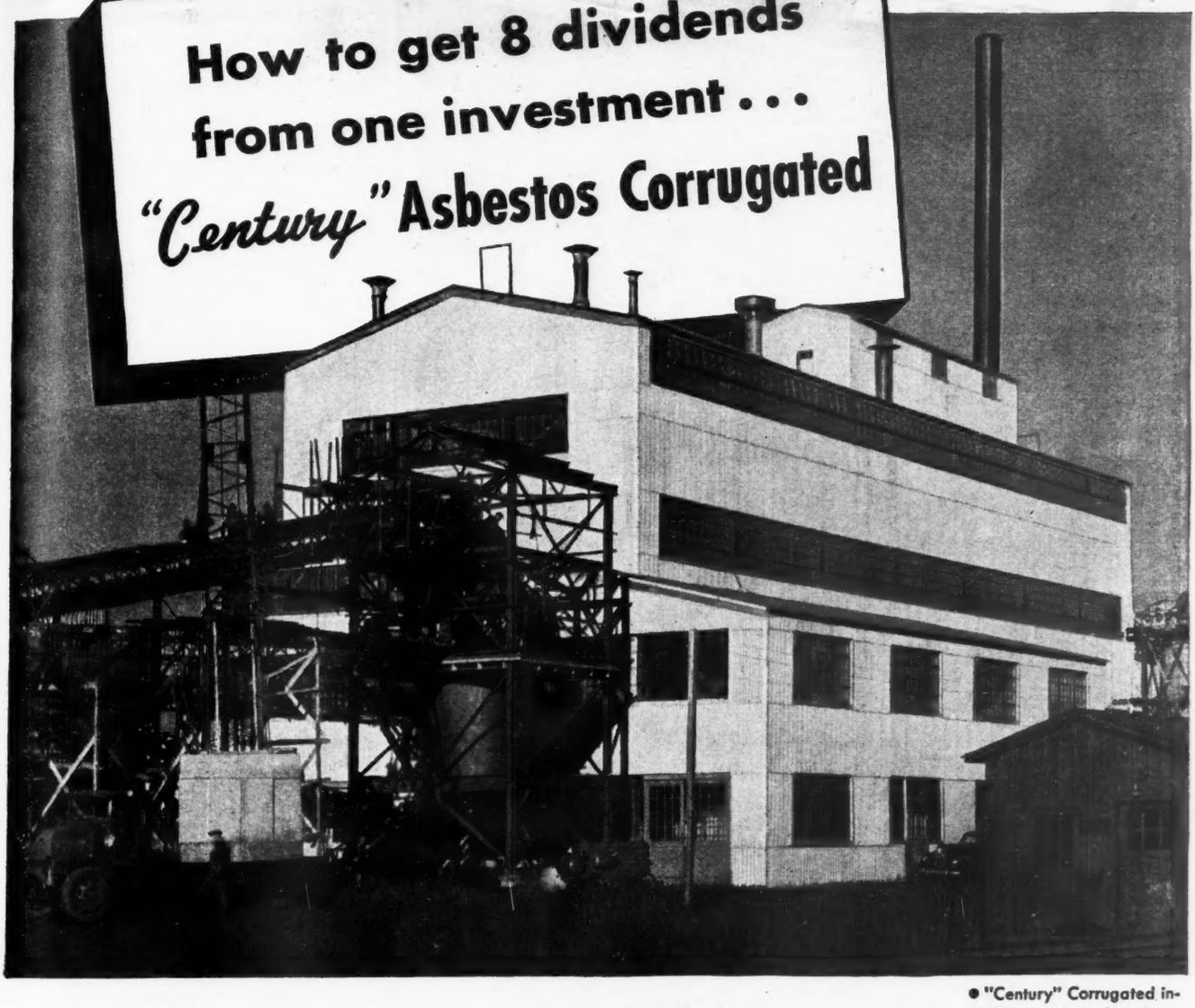
For First Aid

FOR FIRST AID use, Mine Safety Appliances Co., Dept. I, Pittsburgh 8, Pa., has introduced the Redi-Heat block, a new rapid and safe emergency heat source requiring no liquids. The block is entirely self-contained and is always ready for instant use, requiring only about one minute to reach top heat. Wrapped in a towel or blanket the block maintains its temperature for approximately one hour and furnishes safe heat for emergency treatment through the chemical action of a newly developed compound.

Automatic Lubricator

MANUFACTURING rights on the Gun-Fil lubricator have been acquired by the Gray Co., Dept. I, Minneapolis 13, Minn. Designed in four sizes, with lubricant capacities ranging from ½ to 8 oz., these pressure-filled lubricators automatically dispense oil or grease in a measured uniform flow to a moving bearing—and stop feeding lubricant when a bearing becomes motionless. It is claimed that the precise amount of lubricant needed for each individual bearing is thus provided.

How to get 8 dividends from one investment . . . "Century" Asbestos Corrugated



● "Century" Corrugated installation. Note the clean, attractive appearance.

When you build, remodel, or repair with K&M "Century" Asbestos Corrugated and Flat Lumber, you make an investment that pays off 8 ways:

1. Workability

"Century" Corrugated is easy to cut, drill, fasten in place. Holds cutting and fitting time to a minimum.

2. Appearance

Its pleasing light gray color dispels the gloominess that has characterized many industrial buildings.

3. Strength

Made of asbestos and Portland Cement, it is indestructible, actually grows *tougher* with age.

4. Fire-Resistance

Is not only fire-resisting, but also prevents the spread of fire.

5. Corrosion-Resistance

Resists rust, corrosion, smoke, soot, and other objectionable conditions peculiar to industry.

6. Weather-Resistance

Withstands the worst the elements can bring, and has low moisture absorption.

7. Needs No Protective Painting

Never has to be painted, thus eliminates a costly maintenance item.

8. Maintenance-Free

Literally needs no maintenance. Its resistance to time, fire, gases, weather is an inherent quality extending through the sheet. First cost is last cost.

● Plan now to include "Century" Asbestos Corrugated and Flat Lumber in any construction jobs you undertake. Write for further details.

Nature made Asbestos

Keasbey & Mattison has been making it serve mankind since 1873

KEASBEY & MATTISON

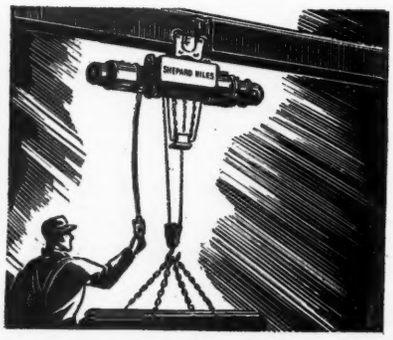
COMPANY • AMBLER • PENNSYLVANIA

• Picking up a load and placing it on the exact right spot is only as efficient as the crane that lifts and carries and lowers its cargo.

Balanced drive gears with automatic oil bath lubrication—permanent alignment—anti-friction bearings—give Shepard Niles cranes precision control operation and more dependability under constant load handling. Shepard Niles cranes are designed and built for tough, long service with a thorough knowledge of the performance expected of them.

* * *

Our staff of engineers are ready today to help you to plan a better, more economical handling system. Write them.



For smooth, constant, dependable lifting and handling, select a Shepard Niles hoist. The completeness of the Shepard Niles line of electric hoists permits the selection of the most efficient lifting and load-moving equipment for any requirement.

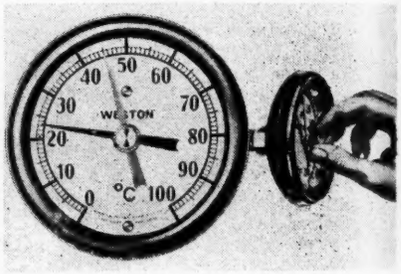
Shepard Niles
CRANE & HOIST CORPORATION

422 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

Six interchangeable valves are available with distinctive colored caps for identification. These exert varying degrees of control of feed on greases of different densities.

Max-Min Thermometer

AN ALL-METAL thermometer known as the "Max-Min" which indicates the maximum or minimum temperatures reached, has been introduced by the Weston Electrical Instrument Corp., Dept. I, Newark, N. J. It has an auxiliary red index which is manually set by a finger knob which protrudes from the center of a scale glass. When a record of the lowest temperature reached is desired, this index is placed to the low side of the temperature



All-metal Max-Min thermometer.

pointer. The pointer will move the index to the lower temperature reached during the operating period, and the index will remain at that low point until manually reset.

For a record of the highest temperature reached, the index is simply set at the high side of the pointer.

Electronic Dispenser

A HIGH-SPEED electronic dispenser, comprising the complete mechanical and electrical means of feeding, counting and dispensing small units, such as candy, is announced by Raymond M. Wilmotte Inc., Dept. I, 246 W. 55th St., New York 19. The unit employs the RCA high-speed, selective, electronic counter as a means of counting the products. Speeds up to 50 per sec. using a $\frac{3}{8}$ in. diameter tablet are obtained. The dispenser is capable of handling sizes from $\frac{1}{16}$ to $\frac{3}{8}$ in. at speeds up to 100 per sec. Items of larger sizes can be handled with special adaptations.

Apron Conveyor

SEVERAL widths, with centers ranging from a minimum of 4 ft. 7 in. to a maximum of 9 ft. 1 in., varied by 18-in. increments, are available in a new line of completely self-contained, factory-assembled, heavy-duty apron conveyors announced by Chain Belt Co., Dept. I, Milwaukee, Wis.

Feeders of this type are used extensively under bins and hoppers for heavy lump material. At a normal

SCHULER POTATO CHIP CO.

From This Humble Beginning...

SCHULER is another example of the way in which American initiative and industry, from small beginnings, has brought the best there is to every American citizen's door.

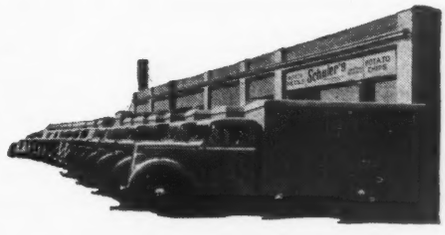
In 1909 Andrew S. Schuler began to make pretzels, using his father's horse and wagon for "distribution". Later he made other food products, specializing in potato chips.

Today, Schuler-owned farms, supervised by trained plant pathologists, produce 325,000 bushels of potatoes annually and 40,000 bushels of certified seed potatoes for the many independent farmers who also supply them.

Two modern plants in Rochester, air-conditioned warehouses, 100 motor trucks and modern packaging in air-tight containers, complete the picture of this industry which grew from a handful of men to more than 500 employees and a well-organized executive group... in the lifetime of its founder.

HOW SCHULER USES RIEGEL FUNCTIONAL PAPERS

Schuler uses printed duplex bags of Riegel's Diafane for all their potato chips as well as most of their other products. Although far from the cheapest packaging for potato chips, Schuler has adopted it as the best way to prevent rancidity and maintain their high quality standards.



SUCCESS STORIES OF AMERICAN BUSINESS

Riegel Papers

FOR FUNCTIONAL PACKAGING

RIEGEL PAPER CORPORATION • 342 MADISON AVE. • NEW YORK 17, N. Y.

AMONG other things, the VOTATOR is a great help in preserving intact the superb but fugitive qualities of the orange.

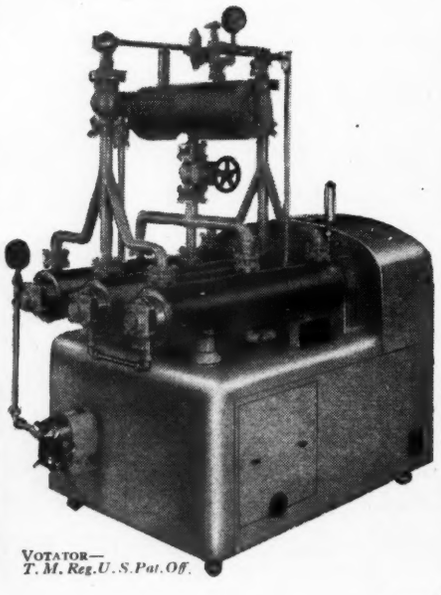
Operating on a continuous basis, a VOTATOR low temperature crystallization unit slush freezes orange concentrate in seconds, *as it flows through the unit.* Fermentation is prevented. Flavor and nutrients are promptly caught and held. And orange juice made from concentrate can now equal the goodness of that made from fresh oranges.

Closed, controlled, compact VOTATOR operation assures uniform results, cuts costs. Refrigerant is used more efficiently than ever. Floor space is saved. Holding time for a solid freeze is cut in half.

In addition to fruit and vegetable products, the VOTATOR is a quality and cost saver for margarine, shortening, lard, plastic cream, starch paste—virtually any food processed in a viscous condition requiring heat transfer. If you process anything in this category write to The Girdler Corporation, Votator Division, Louisville 1, Ky.

District Offices: 150 Broadway, New York City 7; 2612 Russ Building, San Francisco 4; 617 Johnston Building, Charlotte 2, North Carolina.

THE Votator
A GIRDLER PRODUCT



VOTATOR—
T. M. Reg. U. S. Pat. Off.

speed of 10 ft. per min., handling 100-lb. material, capacities of standard units will run up to 80 tons per hr. Because the heavy steel chain belt rides directly on large diameter traction rollers, it is claimed that the new heavy-duty feeder offers longer chain life and reduces power consumption.

Conveying System

PNEUMATIC conveying systems for lumpy, granular or powdered materials is announced by Process Engineers, Dept. I, 508 Third Ave., Pittsburgh 19, Pa. The system does not employ compressed air storage tanks, but utilizes only constant low-pressure air during conveying cycle through easily placed piping. The conveyor can be regulated from ounces to tons per hour to single or multiple receivers. It will convey material over short or long distances, horizontally or vertically. On mixed batches there is no segregation of heavy or light materials regardless of weights or meshes. The system can be operated manually, by remote control, or automatically.

The entire system is self cleaning and eliminates the nuisance and dangers of dust accumulations.

Power Factor Regulator

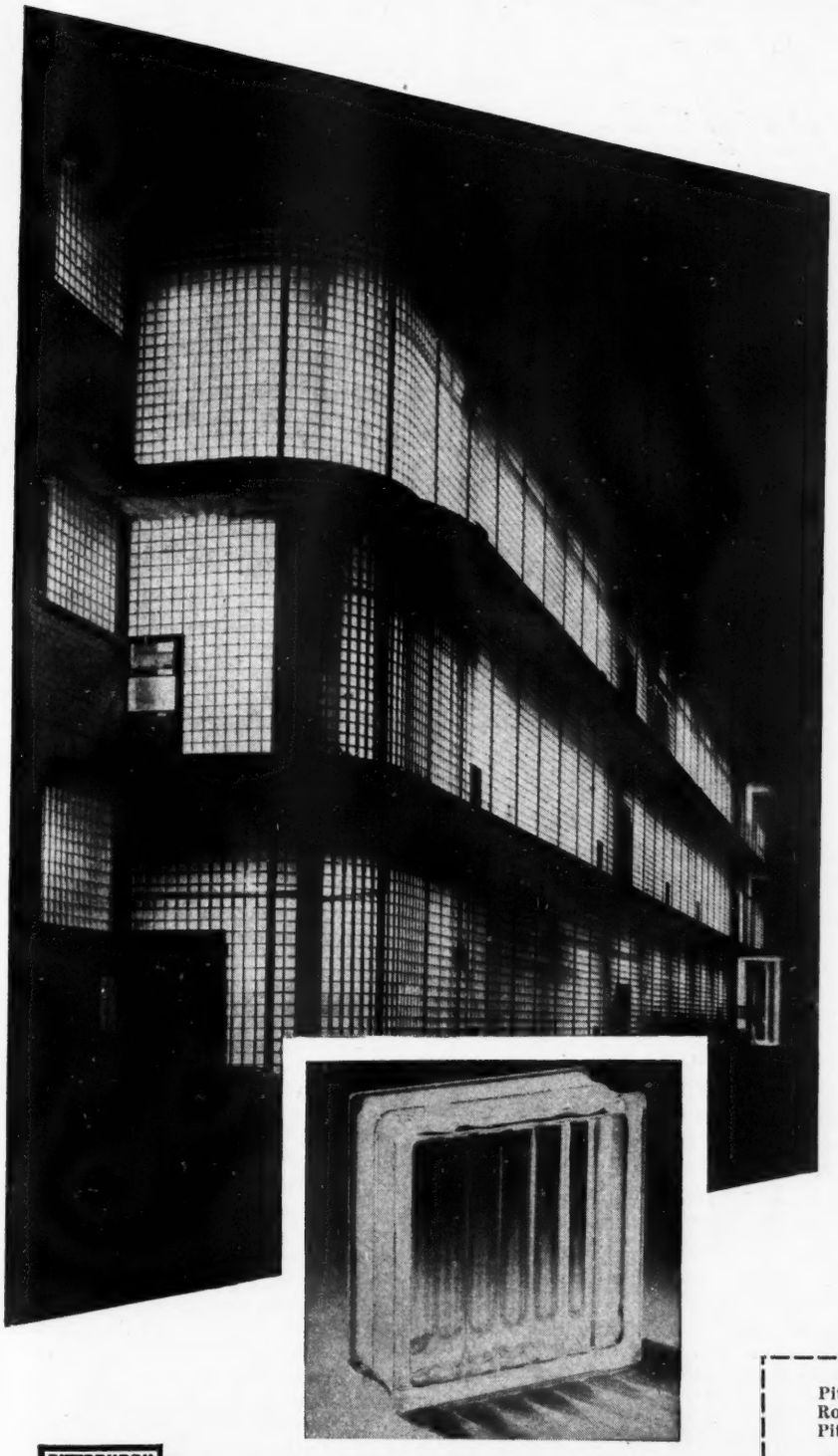
REACTORS and transformers of the dry type and capacitors filled with a non-flammable liquid which eliminates the need for fireproof inclosures are used in the Haug system of power factor regulation recently announced by Modern Control Co., Dept. I, 176 West Madison St., Chicago, Ill. According to the manufacturer, shunt capacitors hitherto used without control circuits for power factor correction have been instrumental in provoking circuit conditions requiring either the removal or the need for providing costly corrective measures. The new system has no moving parts, requires little or no maintenance, is small in size and can be installed in almost any desired location. This system raises the power factor by taking the magnetizing or wattless current off the line, the regulator itself providing the necessary magnetizing component. It is claimed that the use of this equipment greatly reduces the monthly power bill, increases low voltage to the desired value if voltage was previously low due to poor power factor, and improves voltage regulation. Current consumption of the capacitor itself and its control circuit is negligible.

Gasoline Driven Pump

GASOLINE engine driven centrifugal pumps that feature only one moving part, are announced by Maryland Products Co., Dept. I, 600 Wyndhurst Ave., Baltimore 10, Md. The close connected design completely eliminates gears, belts, chains and couplings. There are no relief or by-pass valves

Satisfied users tell why they like

PC GLASS BLOCKS



"Our PC Glass Blocks, by improving our lighting, enable our workers to turn out more goods."

"The big panels of PC Glass Blocks are easily kept clean. There are no unsightly broken panes of glass."

"The insulating properties of PC Glass Blocks decrease heat losses through large lighting areas, even in very cold weather."

THOSE are only a few of the statements made by our satisfied customers. There are many additional reasons why it will pay you to bring more cheerful, bright light into your offices and workrooms with PC Glass Blocks.

You, too, can save money by gaining additional working space, using less artificial light, reducing repairs and maintenance costs, when you install a properly engineered PC Glass Block lighting system.

For your guidance, we have recently published a lavishly illustrated book, showing the many and varied uses of PC Glass Blocks in building construction. Engineering data, typical layouts and specifications are included, as well as the full line of patterns and sizes and a description of the functions of each type of block.

Send for your free copy of this book today. Just fill in and mail the convenient coupon and it will be forwarded promptly, without obligation.

· *Also Makers of PC Foamglas Insulation* ·

PITTSBURGH PC CORNING GLASS BLOCKS

Distributed by

PITTSBURGH PLATE GLASS COMPANY *and by W. P. Fuller & Co. on the Pacific Coast*

Pittsburgh Corning Corporation
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Pittsburgh 22, Pa.

Please send along my free copy of your new book, on the use of PC Glass Blocks for Industrial Buildings. It is understood that I incur no obligation.

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Prompt Shipment . . .

Eleven Ryerson plants provide convenient stocks of Allegheny Stainless—bars, plates, sheets, strip, seamless and welded tubing and pipe, pipe fittings, welding flanges, welding rod, etc. Stocks are unbalanced from a size standpoint because of the great demand and deliveries not as fast as usual, but you can count on prompt shipment of most requirements. The uniform, high quality of Allegheny Stainless plus the expert counsel of Ryerson metallurgists make this the practical source for stainless from stock. Call, wire or write—

JOSEPH T. RYERSON & SON, INC., Steel-Service Plants at: Chicago, Milwaukee, Detroit, St. Louis, Cincinnati, Cleveland, Pittsburgh, Philadelphia, Buffalo, New York, Boston, Los Angeles.

OTHER PRODUCTS:

Bars	Alloys
Structurals	Tool Steel
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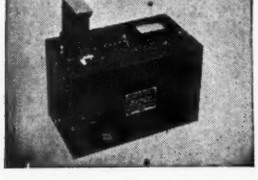
RYERSON STEEL

Steinlite



MOISTURE TESTER

The Fastest in Commercial Use

For really fast work in testing moisture content of dehydrated foods . . . dried eggs, nuts, cocoa and a host of other products . . . use the Steinlite. Almost any operator can get results in two or three minutes . . . a good operator in one minute. Yet the Steinlite is reliable and dependable. It is precision built by a pioneer firm of radio engineers and calibrated against official oven methods. Sold on free trial basis. No money down. Write for circular.

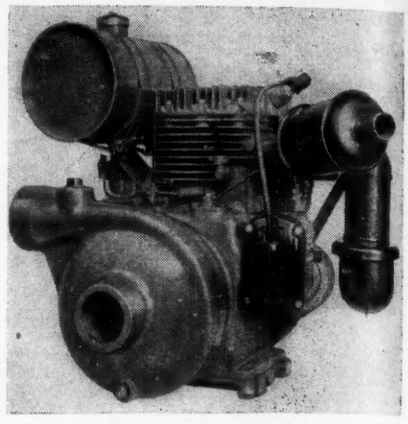
HEADQUARTERS FOR EQUIPMENT

Come to Seedburo for hundreds of items of equipment and supplies . . . seed testing, grain grading, plant maintenance, etc. If you have not received your copy of the Seedburo Catalog and Grain Graders Guide write today.

634 BROOKS BUILDING **CHICAGO 6, ILLINOIS**

SEEDBURO EQUIPMENT COMPANY

Seedburo Quality — Formerly Seed Trade Reporting Bureau — Founded 1912



Gasoline engine driven centrifugal pump.

required. The only moving part is the impeller in the pump, which is rigidly keyed to the engine shaft and revolves within the pump casing with large clearances.

The impeller used in the pump is all bronze and of the closed design insuring high efficiency. Mechanically balanced, it operates smoothly and vibration free.

Gas Measuring Instruments

DAVIS EMERGENCY EQUIPMENT Co., Dept. I, 45 Halleck St., Newark 4, N. J., is extending its line of gas detection and gas analysis instruments to include new types of safety equipment for the detection and analysis of combustible gas or vapor in air, for measuring gas or vapor air mixtures, and for detecting and analyzing any one gas, whether or not combined with other gases. These instruments, of the thermal conductivity type, will be available with direct reading meters or circular chart or strip records, and may incorporate control equipment.

Variable Stroke Pump

STEPLESS capacity variation from 0 to 100 percent is secured by means of simple and compact mechanism in the Automatic Variflo variable-stroke triplex pump now produced by Worthington Pump & Machinery Corp., Dept. I, Harrison, N. J. The 75 hp. model is provided with an hydraulic control cylinder at the left for automatically varying the stroke and hence the delivery. The complete variable stroke mechanism is self contained in the crank shaft, functioning on a simple principle of varying the position of an eccentric to suit the desired stroke or pumping capacity. The pump is suitable for many high pressure services including hydraulic extrusion presses.

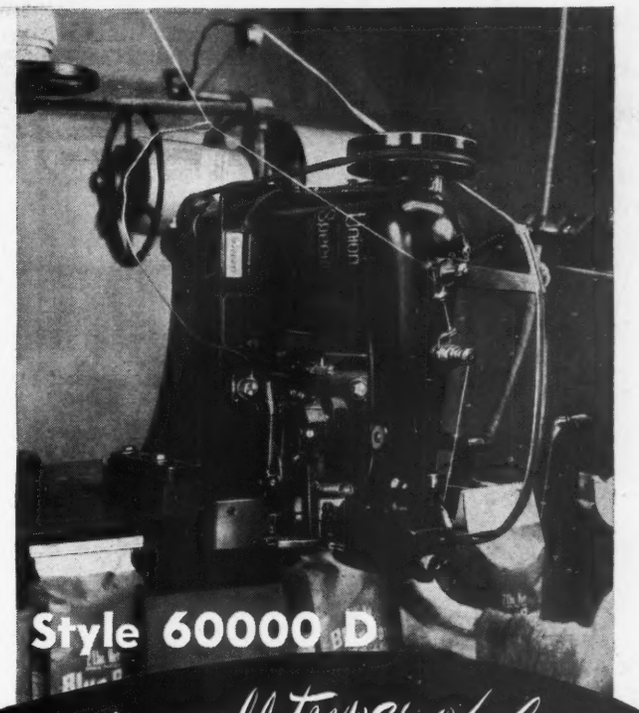
Temperature Regulator

A TEMPERATURE regulator with signal light, either red or white, which glows brilliantly while temperature is rising and shuts off when setting temper-

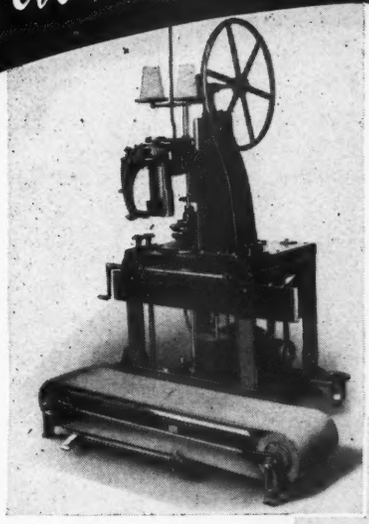
Packaging in Small Paper Bags

The *right* type of closure adds merchandising value to the small paper bag. That means a Union Special Dubl-Tape Closure. Install a UNION SPECIAL STYLE 60000 D sewing head in your packaging department and watch results! The method is fast and economical; the machine is easy to operate, adjustable to a wide range of bag sizes; compared to other bag closing equipment, the investment is modest.

The DUBL-TAPE CLOSURE, sewed with strong stitches through the double safety of two strong paper tapes, makes the small paper bag a neat, sturdy, good-looking package. It is inexpensive to produce and can be used on filled bags up to 25 lbs. size.



newer, better methods of closing all types of bags

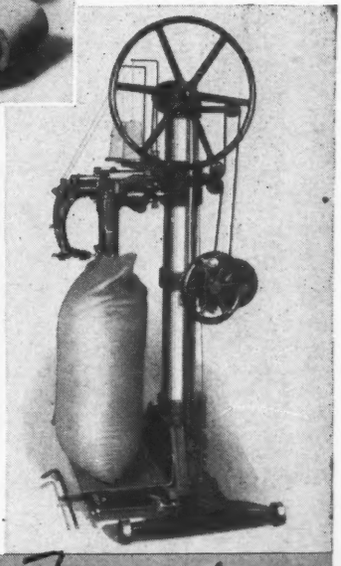


Style 21800 C
is for closing cotton, burlap and paper bags. Designed for mounting Class 14500 medium duty or 80600 heavy duty sewing heads. Independent or synchronized conveyor belt travel. Sewing head and conveyor adjustable vertically.

Closing Larger Paper and Fabric Bags

Machines for closing *all* types of fabric or paper bags are in the Union Special line, including sewing heads, columns, tables, conveyors and accessories. Combination installed to meet any requirement.

Write for Bulletin No. 200
UNION SPECIAL MACHINE COMPANY
450 North Franklin Street, Chicago 10, Illinois



Style 20100 D
is for general utility duty. Has Class 14500 sewing head and floating bag carrier which returns automatically to its loading position when closed bag is removed. Carrier and sewing head both adjustable vertically. Portability makes unit popular.

Union Special *Bag Closing Machines*

FERRY CONTINUOUS POTATO CHIP MACHINE

is completely automatic! Automatic from raw, unpeeled potatoes to finished product. Peeling, slicing, washing, drying, frying and salting . . . all are under perfect control. You can't beat a Ferry Potato Chip Machine.

Also makers of

SLICERS AND AUTOMATIC SLICERS, FEEDERS AND CAN WASHING MACHINERY

J. D. FERRY CO.

129 SO. CAMERON ST.

HARRISBURG, PA.

ature is reached, has been developed and announced by the Washington Glass Laboratory and Instrument Co., Dept. I, 3224 Georgia Ave., N. W., Washington 11, D. C. Temperature range varies from minus 30 deg. F. to 500 deg. F. It has a sensitivity of ± 0.02 deg. F. or better.

This thermoregulator is available in 6, 8, 10, or 12-in. lengths. Contributing to the unit's accuracy and long life is the manufacturer's improved distilling and filling method by which the mercury is distilled directly into the regulator without being exposed to the atmosphere, thus providing higher purity of mercury.

3-Way Valve

A THREE-WAY valve employing a flexible molded synthetic rubber tube, encased within a bakelite body, is announced by Grove Regulator Co., Dept. I, 65th & Hollis Sts., Oakland 8, Calif. It is designed for handling all types

Non-metallic three-way valve.

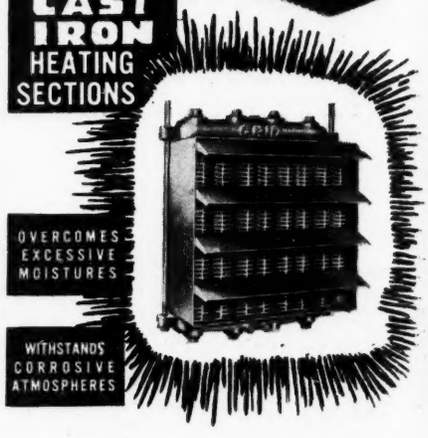
of fluids, including gases, chemicals and liquids. The unit is especially suited for hydraulic or pneumatic cylinder operation. Non-metallic construction permits the handling of corrosive or erosive liquids or gases. It is available in ⅛ in. and ¼ in. I.P.S. for working pressures up to 250 lb. and a maximum temperature of 150 deg. F.

Single Pest-Control Mixture

A SINGLE pest-control chemical mixture containing several active ingredients including DDT which can be applied to growing plants to control most insects and disease of crops and flowers is announced by E. I. duPont de Nemours & Co., Dept. I, Wilmington 98, Del. The material known as "DuPont Garden Dust," is a combination insecticide and fungicide and contains recommended amounts of DDT, rotenone, ferric and zinc dimethyl dithiocarbamates. The result-

HERE'S WHY.... GRID UNIT HEATERS WILL LAST AS LONG AS THE PIPES FURNISHING STEAM TO THEM.....

HIGH TEST CAST IRON HEATING SECTIONS



● One piece construction heating sections (patented) of high test cast iron that withstand steam pressures up to 250 lbs.

● No soldered, brazed, welded or expanded connections to become loose or develop leaks.

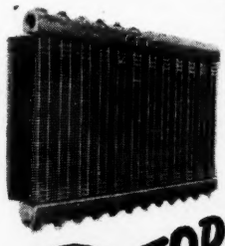
● No electrolysis to cause corrosion, breakdowns, leaks, or heating failures.

It's the material that makes the difference. GRID Unit Heaters are made to last for years—to last as long as the pipes furnishing steam to them.

In many food processing plants GRID High Test Cast Iron Unit Heaters have been operating continuously for over 16 years—without maintenance. Compare GRID with any other unit heater on the market today and you'll see why plants all over the country are installing them. Complete data and capacity tables on request.

BLAST UNITS

The same one piece construction heating sections of high test cast iron that withstand steam pressures up to 250 lbs. . . . no tortuous air passages . . . complete absence of ruptures, strains, and warping . . . compact, easy to clean . . . complete information upon request. Send now for booklet "Corrosion in Unit Heaters" — free upon request.

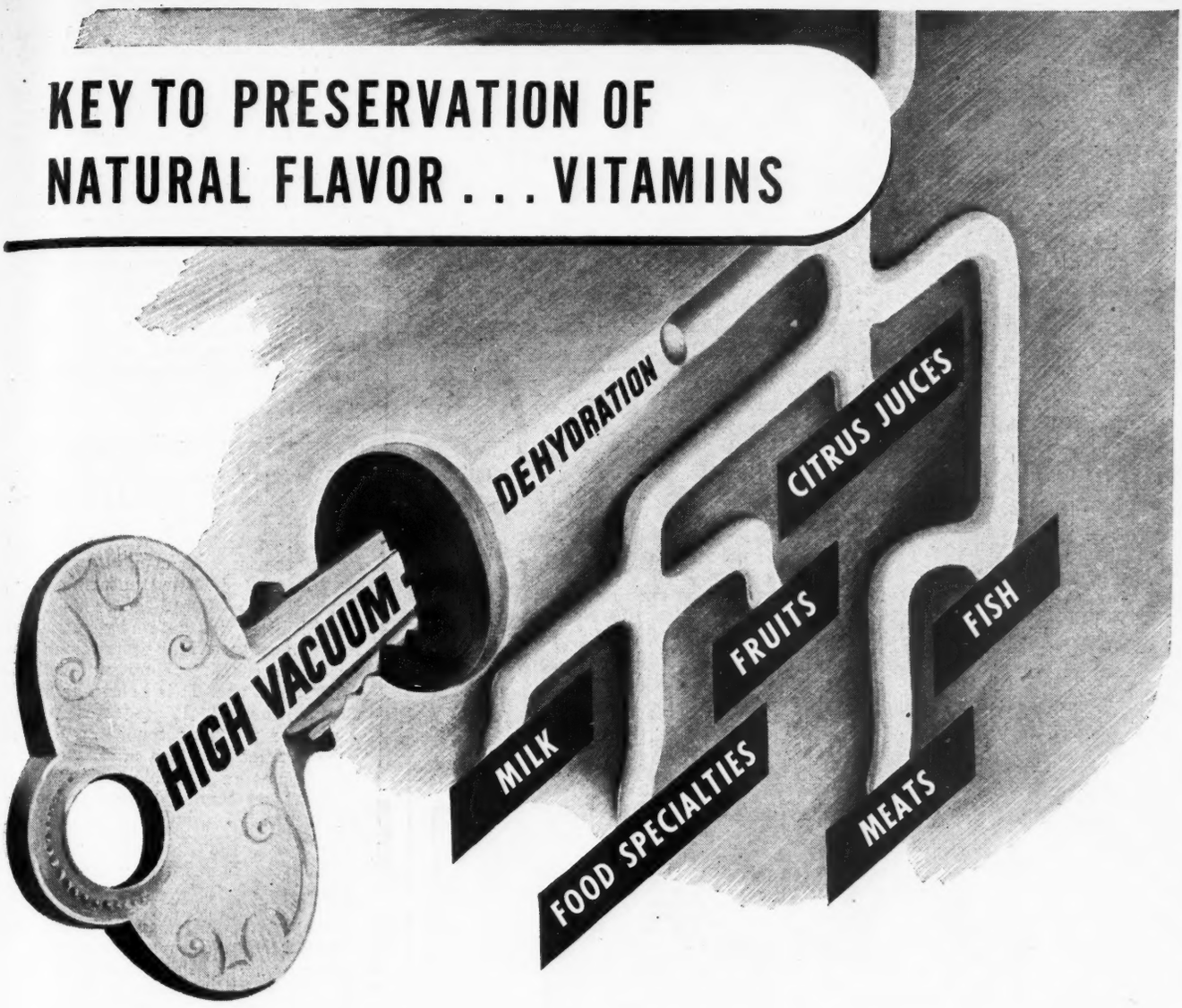


SEND TODAY

D. J. MURRAY MANUFACTURING CO.

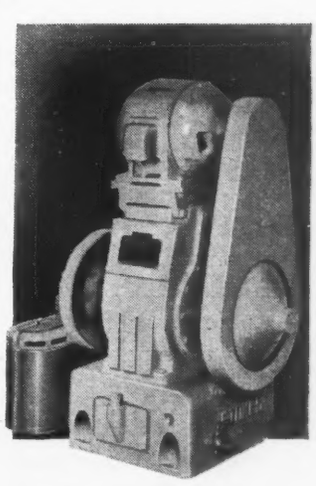
WAUSAU, WISCONSIN

KEY TO PRESERVATION OF NATURAL FLAVOR . . . VITAMINS



Delicate flavors . . . complete vitamin content . . . natural goodness — all can now be captured by a new and amazingly effective method for dehydration and preservation of many food products.

The process is one of sublimation or "freeze-drying" under high vacuum at low temperatures. It is the same process used in developing the vast blood plasma and penicillin programs. Stokes pioneered and developed the equipment for this process — vacuum stills, dryers, pumps, gages . . . and by continuing research has adapted it successfully to the commercial processing of foods.



Citrus fruit juices, for example, are sublimed into the form of crystals . . . easily packaged and preserved. Replacing the water that has been removed, instantly reconstitutes the juices . . . juices in which are retained all the delicate flavors and vitamins and food values of the tree-ripened fruits. With meats, shell fish, fruits, tomato juice, coffee, extracts, milk and food specialties, freeze-drying has proved equally successful.

Stokes' 40 years of experience in the field of high vacuum, plus a wealth of new research knowledge on sublimation, offer food processors a rich source of help in planning for tomorrow's market.

Investigate High Vacuum now! Write to F. J. STOKES MACHINE CO., 5976 Tabor Road, Philadelphia 20, Pa.

F.J.Stokes *High Vacuum*
FJS Est. 1895
PUMPS · GAUGES · EQUIPMENT

The last word . . .

Wyandotte Cleaners always have the last word in *any* cleaning trouble.

Wherever it is—in the cleaning of food equipment or in the department of building maintenance—there's one of these *specialized* compounds designed to meet your particular need. You can count on Wyandotte Products to do their work thoroughly, quickly and safely.

Then—for a final germicidal treatment—use Wyandotte Steri-Chlor* as a rinse or spray on equipment,—also as a germicidal rinse for workers' hands. It will assure you of the utmost in sanitation.

If you would like help in putting Wyandotte Products to work for you, just call your Wyandotte Representative. His training and experience — and the benefits of Wyandotte research and technical field service — are yours for the asking.

* Registered trade-mark.

Wyandotte

REG. U. S. PAT. OFF.

WYANDOTTE CHEMICALS CORPORATION
WYANDOTTE, MICHIGAN

• J. B. FORD DIVISION
Service Representatives in 88 Cities

ing formulation is designed to combat most of the insects and diseases common to garden crops except certain varieties of squash, cucumbers and melons which may be injured by DDT. It may be easily applied by hand or with power equipment as a dust or, mixed with water, as a spray.

A partial list of diseases controlled by this material includes bean and tomato anthracnose, celery leaf blights, leaf diseases of cucurbits, early blight of potatoes, apple rust and scab, brown rot of stone fruits, pear scab, rose leaf spot, carnation and chrysanthemum leaf spots, and various other rusts, mildews, blights and leaf spots.

Non-poisonous Insecticide

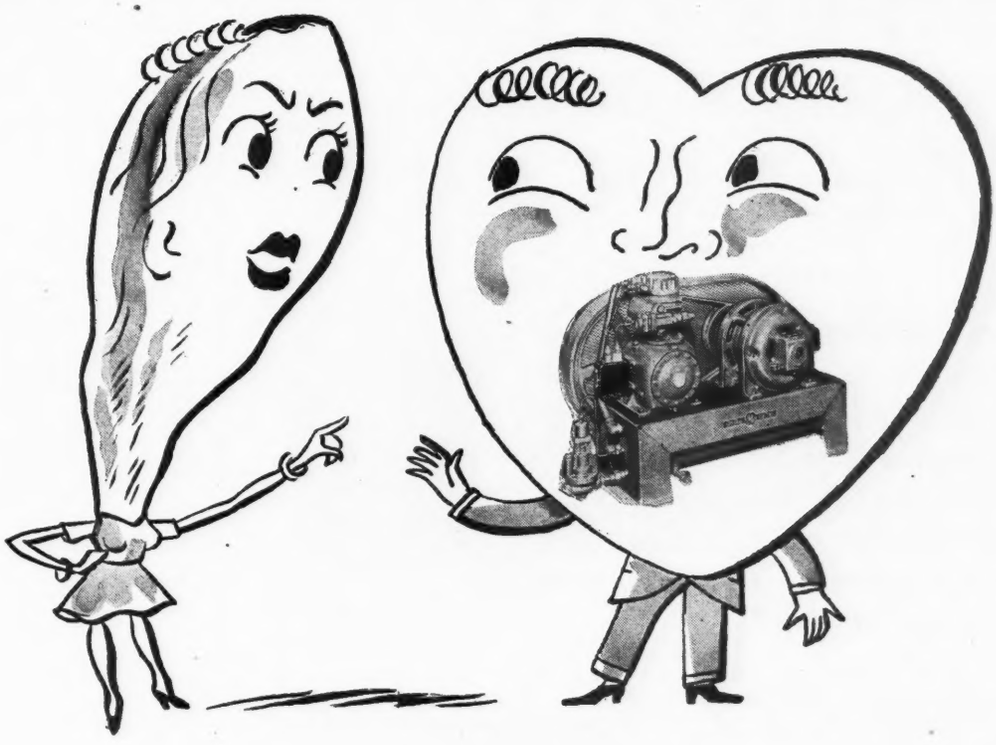
A POWERFUL, non-poisonous insecticide, developed during the war, specifically for killing and repelling roaches, waterbugs, ants, ticks and many other insect pests, is announced by Associated Manufacturers, Inc., Dept. I, 2230 Olive St., St. Louis, Mo. The killing is done by paralysis through contact. War restrictions having been lifted, it is now available for general use. It is known as "KRP Roach Spray." It contains hydrogenated rotenone, rotenoids, and other cubé extracts. It is a stainless spray that leaves an invisible residue. It is harmless to human beings and other warm blooded animals.

Sandwich Machine

A PEANUT butter sandwich machine which enables the operator to make as many as sixty sandwiches per minute has been placed on the market by Shumann Equipment Co., Dept. I, 1208 East Carson St., Pittsburgh, Pa. It consists of an aluminum hopper with discharge spout and an auger feed which, operated by a ¼-hp. electric motor, forces the peanut butter continuously from the spout in the form of a ribbon. Discharge spouts in sizes to give any desired thickness and width of ribbon can be furnished. A simple valve lever on the spout permits adjustment of speed to operator's capacity.

Anti-Slip Coating

ADDITION of a new product to its line of industrial coatings has been announced by the Flintkote Co., Dept. I, 30 Rockefeller Plaza, New York 20, N. Y. Under the brand name of Flintred this new product consists of a synthetic plastic anti-slip coating which is applied by trowel over steel, concrete, aluminum, galvanized iron, hard tile and wood floors. On clean steel it serves as a corrosion resistant protective coating in addition to its function of overcoming slipperiness. It is resistant to water, gasoline, oil, alcohol, and ordinary fats and greases. Flintred will be available in red, green and slate blue, and is usually applied



"You gave me the cold shoulder, Sir"

— said Miss Mutton

MR. G-E CONDENSING UNIT: *Indeed I did*—I'm a *G-E* Condensing Unit—heart of the refrigerating system—and that's my job.

MISS MUTTON: You're a chiller-diller, all right. Old age doesn't seem to slow you up much.

MR. G. E.: Why, bless my compressor, I've got a reputation to uphold, Miss M., the well-known G-E reputation for reliability.

MISS MUTTON: Well, you've got to admit that the G-E Dealer has been a big help to you when you needed him. I notice he's been fixing other units that aren't G-E, too.

MR. G. E.: Sure, he's glad to help the boss out until new G-E units are available. He's got some swell ideas about modernizing the whole refrigeration system, too.

MISS MUTTON: Well, I certainly hope the boss doesn't get anything but G-E units in here. I'd hate to be cramped by those big, old-fashioned jobs. And isn't it true that you G. E.'s use Freon gas?

MR. G. E.: Right you are, lamby. Non-toxic, non-inflammable, non-explosive *Freon!*

MISS MUTTON: No wonder *everybody* says G-E Condensing Units are just grand. If I stay fresh as a daisy, G. E., it's all because of you.

MISS MUTTON & MR. G-E. TOGETHER: Just a word more. We hope you'll call your G-E dealer today for full information. He's listed in your Classified Telephone Directory under "Refrigeration."

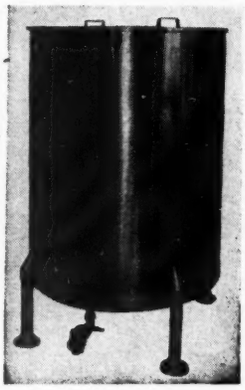
General Electric Co., Air Conditioning Department, Section 68910, Bloomfield, New Jersey

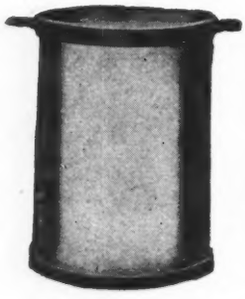
GENERAL ELECTRIC

TERRISS
SEAMLESS, STAINLESS
STEELWARE

TANKS:

18-8 Stainless Steel. Highly polished No. 4 finish inside and out. Pitched bottom, self-draining. Stainless Steel covers. Stands pipe leg type. Built-in agitators for fast or slow speed, if desired. 25, 35, 50, 60, 100, 160, 200, 300, 400 and 500 gallon sizes . . . also built to special specifications.





BATCH CANS

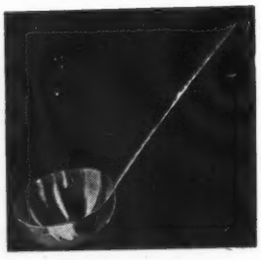
Monel metal or stainless steel. Endless iron ring, handles attached, reinforces top. Bottom reinforced by iron cross welded to iron chime. 10 to 75 gallons.

PAILS

Seamless stainless steel. Capacities, 12 and 15½ quarts.

DIPPERS

72 oz. with 17" hooked handle. Also some one, two and four-quart FLAT dippers.



BUCKETS

Seamed buckets made of Monel Metal or Stainless Steel. Specially constructed to prevent spilling when pouring. There is a removable mesh screen on the spout to filter out solid particles. 10 and 14 quart capacities.

The above are representative of our line of TERRISS Stainless Steelware. We are also prepared to fabricate equipment to specifications.

We carry a full line of Filter Paper. Also, Hose for all purposes. Send us a sample of your needs.

IMMEDIATE DELIVERY

CONSOLIDATED
SIPHON SUPPLY CO., INC.
Dept. F, 22-24 Wooster St. New York 13, N. Y.

in coats of approximately $\frac{1}{16}$ to $\frac{1}{8}$ in. in thickness.

This new coating is not a paint. It is a synthetic plastic material incorporating a mineral type filler which imparts toughness to meet wear and tractive resistance against slipperiness when wet. While it is flammable in liquid form, when it has hardened after application it is non-inflammable to the degree that it will not support combustion.

It should be stored and applied at temperatures within the temperature range of 50 to 100 deg. F. It is available in 5 gal. containers and its coverage varies with the type of surface on which it is used. It is recommended for use around machinery, on steps and ladder treads, on ramps and platforms, on steel decks and floors, and on areas that become unsafe underfoot when wet from water, oil or other similar materials.

Nitrocellulose Coating

DANGER of bottle breakage can be obviated, it is claimed, through the use of a tough nitrocellulose plastic coating which serves as a protective armor around a glass bottle and holds its shape, even though the glass underneath is shattered. Protected bottles of this type have been developed by the Detroit Macoid Corp., Dept. I, Detroit, Mich., according to Hercules Powder Co., Wilmington, Del.

At the present time 1-gal. bottles are being coated in this fashion with a solution based on Hercules nitrocellulose. An even film of 20-25 thousandths of an inch is secured by a dipping operation.

Immersion Heater

A SELF-CONTAINED unit for installation in industrial water tanks, drums, processing kettles, stills, sterilizers and similar equipment, which provides automatic electric heating for liquids, is available in a new immersion heater announced by the American Instrument Co., Dept. I, Silver Springs, Md. The heater incorporates an automatic temperature control which, once installed and set for the desired working temperature, permits maintenance of any temperature from room temperature to 350 deg. F. with a conservative accuracy of plus or minus 5 deg. F. A built-in safety control limits the temperature rise of the heater and thus protects it against overheating and burning out, should the liquid level fall and expose the heating element to the air.

The heater can easily and quickly be screwed into the walls of a tank or other container through a 1-in. pipe fitting or reducer, only two wires being connected from the current supply to the heater. Two or more such heaters can be installed on one application if desired. The sheath of the heater cannot become electrically energized, thus eliminating danger of the material becoming electrically charged. A

Every NIGHT *is* SATURDAY NIGHT *with* KANRY-TEX!

CLEANLINESS in use and appearance is a vital factor of belting in food and canning plants. That's *one* of the reasons why leading processors have chosen Globe KANRY-TEX.

Easily washable with hot water, live steam, or sterilizing agents, KANRY-TEX keeps spic-and-span during its entire long life—

—years of wear with minimum care. Then, too, KANRY-TEX does not impart odor or taste. It's strong. It's durable. It's economical. It resists moisture, alkali, fats and oils.

Add together these facts, plus technical points of superiority, and the answer sums up to thousands of perfectly-satisfied users.

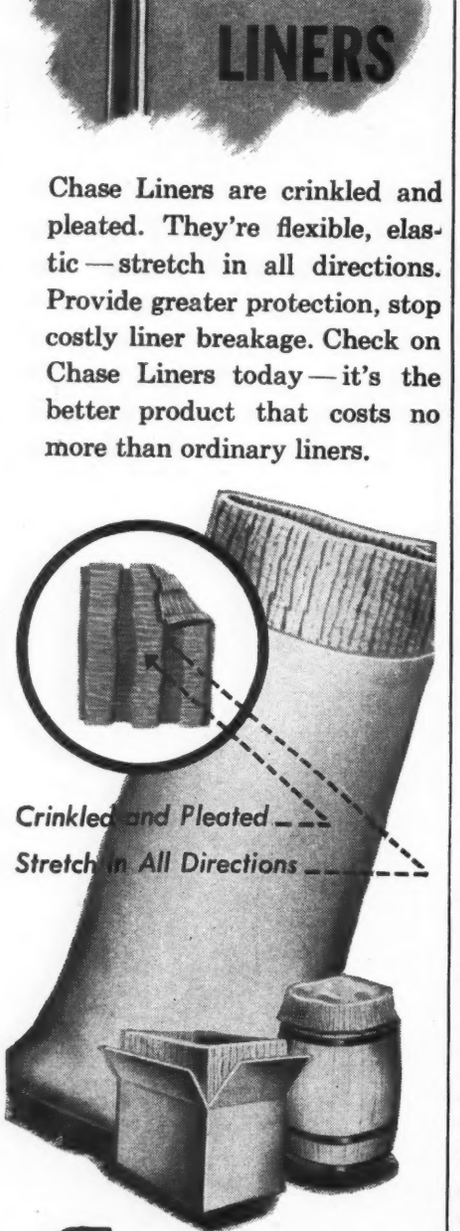
Does not impart odor or taste.
Resists moisture — alkali — fats — oils.
Easily washable with hot water, live steam, or sterilizing agents.
Long-lasting. Economical.

We'd like to tell you more in detail about the advantages of Globe KANRY-TEX. We're sure you'll be interested for many practical reasons. Write today to your mill-supply house—or direct to us.

GLOBE WOVEN BELTS

GLOBE WOVEN BELTING CO. 1403 CLINTON ST., BUFFALO 6, N. Y.

Chase Liners are crinkled and pleated. They're flexible, elastic — stretch in all directions. Provide greater protection, stop costly liner breakage. Check on Chase Liners today — it's the better product that costs no more than ordinary liners.



CHASE BAG CO.

GENERAL SALES OFFICES
309 WEST JACKSON BLVD., CHICAGO 6, ILL.

BOISE • DALLAS • TOLEDO • DENVER • DETROIT • MINNEAPOLIS
ST. LOUIS • NEW YORK • CLEVELAND • MILWAUKEE • PITTSBURGH
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NEW ORLEANS • ORLANDO, FLA. • SALT LAKE CITY • OKLAHOMA
CITY • PORTLAND, ORE. • REIDSVILLE, N. C. • HARLINGEN, TEXAS
CHAGRIN FALLS, O. • HUTCHINSON, KAN. • WINTER HAVEN, FLA.

pilot light is provided to indicate when the heater is functioning. Such heaters are available with copper sheathing for water heating or steel sheaths for light oils, in wattage ratings of 250, 500, 750 and 1,000.

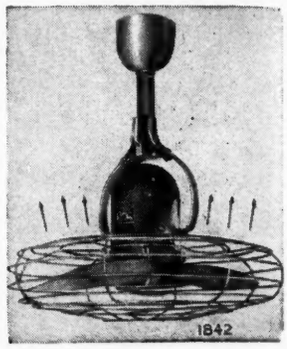
Thermoplastic Resins

MANUFACTURED for military purposes during the war, a new series of resins under the trade name of Kendex is now being manufactured by the Kendall Refining Co., Dept. I, Bradford, Pa. These resins were not available before the war, although their development goes back further than that. The Kendex resins range from hard brittle substances to tough rubbery products with some of the characteristics of elastomers. The surface and feel may be waxy, tacky, or hard and mar-resistant. All of these products are characterized by their dark color which ranges from a brownish black to jet black. Some are claimed to be outstanding in the hydrocarbon resin field because of the relatively small variation in physical properties caused by temperatures changes. They are all produced from petroleum. Suggested uses for the various Kendex resins include the following: laminants, adhesives or binders, mastic binders, baking varnishes, pipe coatings, polishers, casting waxes, sealing compounds, water resistant coating compounds and many others. These resins are all thermoplastic and may be applied hot or by many of the usual methods such as hot melt dipping or saturating, doctoring, spraying, roll coating, extruding, etc. The flash and fire points of all the Kendex resins are well into the safe working range for hot application. Some of these resins may be emulsified and they all may be handled cold as liquids by blending with various solvents. They are marketed in 100-lb. non-returnable fiber containers or in 350-lb. drums.

Aluminum Finishes

NOW AVAILABLE for civilian use, nine types of aluminum protective coatings designated as the Alumcote series has been announced by the Watson-Standard Co., Dept. I, Pittsburgh 12, Pa. Incorporating a number of improvements developed during the war, these coatings have been designated to specific requirements. They are claimed to make possible smoother, more brilliant and more durable product finishes. Coatings in this series are recommended for use in a number of different applications in various fields. An Alumcote finish for black plate should be of interest to container manufacturers, metal fabricators and to lithographers. A heat-resistant coating is available for reflectors and heaters. Smooth, tough and brilliant coatings have been formulated to withstand abrasion and severe handling. Paper converters, too, are expected to find Alumcote suitable for producing embossed, decorative and protective food packing products.

Reco RADI-Aire
HEAT CIRCULATOR



Provides comfortable heat when operated at slow speed for hard-to-heat rooms. The RECO blows upwards, the air traveling slowly along the ceiling, down the walls and up the center again, breaking up the hot air pocket trapped at the ceiling and intermixes it with all of the air in the room. This provides uniform temperature and humidity at the floor and at body level.

DISSIPATES STEAM, ODORS and SMOKE

The revolutionary action of the RECO, dissipates steam, smoke, odors and gases and provides fresh, re-vitalized air instead. Can be supplied in ceiling model as illustrated and in high stand and table models.

Write for Bulletin 221-A giving complete information.

REYNOLDS ELECTRIC COMPANY

Mfrs. of Refrigerator Fans, Fly Chaser Fans, Air Circulators, Food Mixers and Vegetable Peelers.

2668 W. Congress Street, Chicago 12, Illinois

Vi-Co

NATURAL "B" COMPLEX YEAST VITAMIN PRODUCTS AND YEAST DERIVATIVES

Plasmolyzed Yeast Extracts for FOOD and AMINO ACID PREPARATIONS

Vi-Co Plasmolyzed Yeast Extracts are prepared by enzyme digestion of brewers' yeast to yield a B complex product rich in essential amino acids. Amino acids provide the necessary "building blocks" for healthier and stronger bodies.

These products possess a definite "meat-like" flavor useful in enriching soups, bouillon cubes, tomato juice and other packaged foods. Such enriched foods are also of value for their natural B complex and high amino acid composition.

Consult us about your vitamin or yeast problems. Our technical staff can best advise you how Vi-Co products can be used to enrich your own products.

VICO PRODUCTS CO.
415 W. Scott St. • Chicago 10, Illinois

CATALOGS, BULLETINS

This digest of manufacturers' new publications is offered by FOOD INDUSTRIES Readers' Service as a convenience for executives. To obtain this literature, fill in the coupon, clip to your letterhead, and mail to FOOD INDUSTRIES.

Food Plant Equipment

Processing Equipment 1
Processing equipment including motors, motor controls, power generation and distribution equipment, screens, feeders, washing equipment, pumps, crushers, grinding and roller mills, blowers and compressors and electronic heating are generously illustrated in a 16-page booklet, No. 25B-6177B, released by Allis-Chalmers Mfg. Co.

Safety Equipment 2
Pulmosan Safety Equipment Corp.—36,-page catalog describing Pulmosan respirators, masks, helmets and hoods for protection against dust, fumes, vapors, paint sprays, gases, acids, sandblasting, babbitting, boiler cleaning, etc. Includes general information on how to care for respirators and detailed recommendations on the proper use of this equipment.

Food Freezing 3
Salem Engineering Co., has issued a 4-page bulletin picturing a conveyor system of freezing that is coordinated with the packaging machine, placing production on a continuous basis. Food is placed on revolving racks that go through the freezing chamber for a predetermined time. When properly frozen, at the end of a revolution, the food is taken out, ready for storage or shipping.

Storage Batteries 4
Gould Storage Battery Corp.—Illustrated catalog featuring the storage batteries manufactured by this company for industrial truck and tractor service. Included are discussions on the theory of lead-acid storage batteries and the care and maintenance of batteries.

Bucket Elevator 5
A loop-type bucket elevator, which is internally loaded, is described in Folder No. 1983 just published by Link-Belt Co. This unit is intended for the gentle handling of small products. A new principle of loading and discharging is described and illustrated.

Relief Valves 6
Farris Engineering Co.—Catalog No. 45, featuring safety and relief valves manufactured by this company. A catalog supplement, No. 45 A, gives prices for this equipment.

Electrical Equipment 7
Consolidated Diesel Electric Corp.—Bulletin CD-101. 4-page leaflet featuring the diesel electric generator sets manufactured by this company.

Process Equipment 8
The Youngstown Welding and Engineering Co.—16-page brochure illustrating and describing the various types of process equipment, tubing, fittings, etc., made by this company.

Filters 9
Filtration Engineers, Inc.—16-page illustrated bulletin featuring this company's rotary vacuum filters for various industries including chemicals, foods, ceramics, metallurgy, pulp and paper, sewage, etc. The principles of operation of the FE String Discharge Rotary Vacuum Filter are discussed and illustrated. Construction details are given and a section is devoted to materials of construction, motor drives, filter cloth, and the FE automatic valve.

Hot Water Mixing Units 10
Klingerit, Inc.—A 4-page bulletin on "Strahman" hose stations and mixing units. It describes how cold water, and steam are mixed to produce hot water, with and without check valve. How the unit operates is illustrated by cutaway drawings.

Expansion Joints 11
Cook Electric Co.—A 12-page catalog No. 240M which lists complete engineering data, dimensional tables and specifications for "MagniLastic's" standard packless expansion joints, anchor joints and low pressure, large diameter expansion joints.

Protected Motor 12
The Louis Allis Co.—Bulletin No. 720 covering their Type OG standard squirrel cage induction motor. The motor described is of the protected type that has been tried in critical war jobs. The bulletin covers fully the construction, features, and some typical applications.

Boilers 13
John Nooter Boiler Works Co.—Two leaflets featuring the facilities and services offered by this company in the manufacture of boilers and other process equipment. Includes data on this company's metallizing service, and also features the corrosion resistance equipment manufactured by this company.

Filters 14
Niagara Filter Corp.—Bulletin A-246, Booklet describing Niagara filter systems for a wide variety of applications in a number of different process industries.

Diesel Engines 15
Cooper-Bessemer Corp.—8-page folder featuring the Type FW-supercharged locomotive diesel engine available from this company.

Regulating Valves 16
Strong, Carlisle and Hammond Co.—Catalog 155. 12-page illustrated catalog featuring pressure regulating valves for steam, air and gas, furnished by this company. Types, sizes and capacities, together with list prices are given.

Driers 17
J. O. Ross Engineering Corp.—2-page leaflet featuring the ovens and driers manufactured by this company.

Equipment 18
Gardner-Denver Co.—Illustrated brochure giving the history, organization and facilities of this company. Shows application pictures of the various products made by this company.

Resistors 19
Clarostat Mfg. Co., Inc.—Catalog No. 46. Lists the resistors, controls and resistance devices manufactured by this company. Includes rheostats, potentiometers, switches, etc.

Tube Fittings 20
Flodar Corp.—Catalog No. 101 describing and illustrating "Griptube" series of tube fittings, especially designed to solve hydraulic tube problems. Sketches show how fittings connect to flare, prevent twisting of tube during tightening of nut and how they permit shorter bends for closer quarters.

Speed Drive and Indicator 21
Reliance Electric & Engineering Co.—Bulletins No. 311, 314, and 406 dealing with all-electric adjustable-speed drive for a.c. circuits, and continuous-speed indicators.

Diesel Electric Sets 22
Caterpillar Tractor Co., describes Diesel Electric Sets in a 20-page booklet No. 9321. A number of types are included with their respective kilowatt ratings and other characteristics. Photographs of a number of actual installations, are given.

Proportioners 23
Proportioneers, Inc.—A new bulletin "Chem-O-Shot" which describes a plastic proportioner equipped with a special high strength corrosion resistant plastic frame and "See-Thru" reagent head.

Electrical Equipment 24
Ideal Industries, Inc.—2-page leaflet featuring the split bolt connectors for making permanent or temporary solderless connections. List prices are included.

Glass Pasteurizer 25
Bulletin No. 87, released by Barry-Wehmiller Machinery Co., describes and illustrates the "Vortex" pasteurizer. A sketch, in colors, shows the progress of the ma-

Good until January, 1947

FOOD INDUSTRIES READERS' SERVICE

FOOD INDUSTRIES, 330 W. 42nd St., New York City 18

Please have manufacturer send me, without obligation, literature circled below.

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10-46

EYE-APPEAL OF YOUR PRODUCT IS NOT ENOUGH

Eye-appeal of your packaged product . . . its attractive label, product shown in color, convenient size . . . is not enough to induce continued customer use **AFTER** the first sale. Taste, flavor and quality still remain factors that importantly influence consumer acceptance!

Whatever you pack, it is these factors that so often are detrimentally affected by the incomplete removal of contaminating deposits and organisms on equipment and unsatisfactory plant sanitation.

Nearly 40 Years Successful Sanitation Experience At Your Service

In the plants of hundreds and hundreds of well-known canners and packers of food products, the reliance on successful Oakite sanitation experience and personalized service, together with the use of specialized Oakite cleaning materials and methods, has been a significant contributing factor in maintaining required sanitary standards and improved quality control. It is why we invite you too, to take full advantage of the many benefits provided by

OAKITE *Specialized* CLEANING

TRADE MARK REG. U. S. PAT. OFF.

Wide Range of Oakite Materials For Every Food Plant Cleaning Problem

The combination of nearly 40 years experience, a nation-wide field staff and a wide range of cleaning, germicidal, deodorizing, descaling and other Oakite materials enables us to bring to every food product plant a service that is the starting point for lower cost cleaning, more efficient equipment and plant sanitation.

Free Sanitation Manuals Yours For the Asking

If your business is one of those listed at right, ask us to send you the Oakite Sanitation Manual relating to it. There is no cost, no obligation. Your letterhead request will be promptly answered. Write for your **FREE** copy today.

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- ***Fruit & Vegetable Canning***
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OAKITE PRODUCTS, INC., 36G Thames St., NEW YORK 6, N. Y.
Technical Service Representatives Conveniently Located in All Principal Cities of the United States and Canada

terial through various zones in the equipment from the precooling reservoir, to the preheating part, thence to the pasteurizing zone and finally to the cooling section.

Air Compressors 26
Schramm Inc.—A 44-page bulletin No. 45A in colors, describing and illustrating a full line of portable and stationary air compressors.

Pressure Gage 27
Gotham Instrument Co., Inc.—An 8-page illustrated catalog No. G-12 on their new pressure guage line.

Filters and Mixers 28
Alsop Engineering Corp.—A 12-page catalog No. 745 which covers some of the filtering, agitating, mixing and storage equipment units available.

Also 24-page bulletin No. 144 which provides specific information on their fuel and oil filters, as well as a brief outline of the general purpose filters for water and other purposes.

Filters 29
Drico Industrial Corp.—A 50-page brochure on the general subject of filters for gases and liquids. It discusses several fields of application, clearing away some misconceptions, and tells what filtration efficiency is. Each topic, in addition to being thoroughly discussed, is fully illustrated.

Room Conditioners 30
York Corp.—Bulletin 46826 which describes and illustrates three newly-created room conditioners. Two are window sill models designed particularly for air conditioning small offices or relatively small rooms. They lower both the humidity and temperature, clean and circulate air, as well as removing stale inside air.

Plant Supplies

Silicone Varnish 31
Silicone varnish, which cures at ordinary baking temperatures and protects electrical equipment operating continuously at temperatures up to 350 deg. F. and subject to excessive moisture, is described in a 4-page bulletin, Resin Series No. 1, issued by Dow Corning Corp. It contains practical instructions on how to apply and cure "DC 996" silicone varnish.

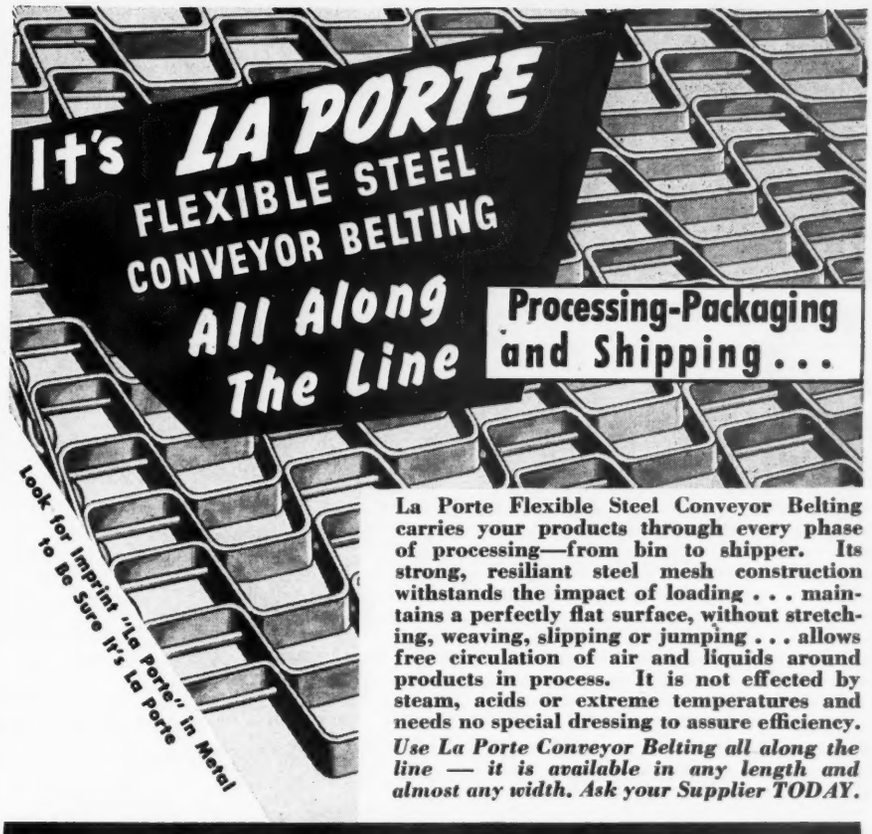
Effective Chlorination 32
Seventy percent calcium hypochlorite under the trade name of "Pittchlor," for use in connection with sewage treatment, is described in a leaflet issued by Pittsburgh Plate Glass Co.

Glass Bottles 33
A beautifully illustrated brochure on the story of "Men and Glass" has been published by Armstrong Cork Co. Its 22 pages show typical stages in the making of top quality glassware, including research, design, mold making, control, packing and testing.

Laboratory Supplies 34
Burrell Technical Supply Company has issued Bulletin No. 46-1-21, covering a general line of scientific equipment.

Stainless Steel 35
Lebanon Steel Foundry.—4-page leaflet featuring the straight chromium stainless steels made by this company. Includes data on the five grades of stainless made by this company. Contains a list of materials which do not corrode these steels.

Paper Shipping Sacks 36
Bemis Bro. Bag Co. has released a 16-page book called the "Packaging Picture." The story is told almost entirely by pictures, with a very brief text. The treatment follows the style of *Life* magazine.



La Porte Flexible Steel Conveyor Belting carries your products through every phase of processing—from bin to shipper. Its strong, resiliant steel mesh construction withstands the impact of loading . . . maintains a perfectly flat surface, without stretching, weaving, slipping or jumping . . . allows free circulation of air and liquids around products in process. It is not effected by steam, acids or extreme temperatures and needs no special dressing to assure efficiency.

Use La Porte Conveyor Belting all along the line — it is available in any length and almost any width. Ask your Supplier TODAY.

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

Packagings that sell

ALL KINDS OF FOOD

A complete line of wrappings, bags, envelopes and boxes in cardboard, glassine, cellophane, pliofilm, laminated papers, etc. for food packaging. Stock or original packages designed. Write today for complete information.

See you in Cleveland—at the Refrigeration and Air Conditioning Exposition Public Auditorium—October 29 to November 1. Booth No. 309.

PACKAGING DIVISION 777 Public Ledger Bldg.
E. W. Twitchell Incorporated Philadelphia 6, Pa.

LARGE DIAMETERS

FOR *EXTRA* YEARS OF MAXIMUM

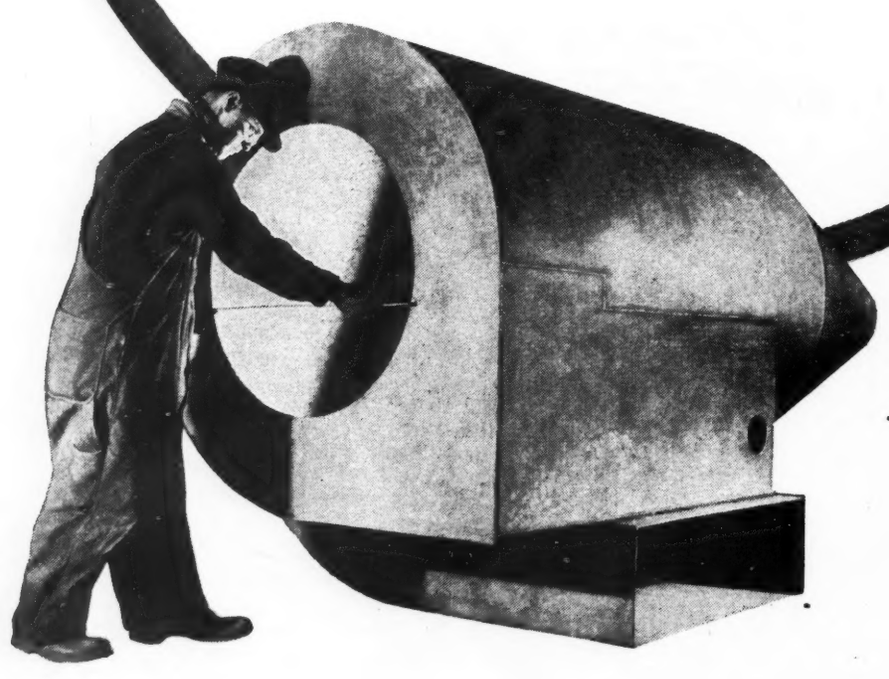
Dust recovery

Because of Buell's exclusive feature—the patented van Tongeren "shave-off"—the cyclones in Buell Dust Recovery Systems do not have to be made with small diameters in order to achieve high recovery efficiency. On the contrary, diameters of Buell cyclones can be in excess of four feet without loss in efficiency.

These large diameters make possible operation with low centrifugal force and consequent reduction in abrasive wear; and permit one-piece construction of extra-thick steel, with large duct outlets, that makes clogging virtually impossible.

All these are prime factors in the trouble-free operation, low maintenance cost, and high efficiency of custom built Buell Dust Recovery Systems—as established from actual records of installations in service for three, four, five or more years.

Buell's book—"The van Tongeren System of Industrial Dust Recovery"—illustrates and explains the patented van Tongeren principle and its many applications to industry. We will be pleased to send you a copy without charge. Write for it today.



Six Exclusive Buell Features

1. THE "SHAVE-OFF"
2. ✓ LARGE DIAMETERS
3. EXTRA-STURDY CONSTRUCTION
4. CORRECT HOPPER DESIGN
5. SPLIT-DUCT MANIFOLDING
6. INNER WELDS GROUND SMOOTH

BUELL ENGINEERING COMPANY, INC.
8 Cedar Street, Suite 5000, New York 5, N. Y.
Sales Representatives in Principal Cities

buell DUST RECOVERY SYSTEM

It tells how multi-wall bags are made, how the quality is controlled and how brands are designed. It also tells how expert advice and assistance can be secured. Many actual applications of these bags are illustrated in the book.

Essential Oils 37
Magnus, Mabee & Reynard, Inc.—A 50-page catalog and price list covering essential oils, balsams, oleoresins, concentrated flavors and basic perfume materials.

Lubrication 38
Gulf Oil Corp.—20-page booklet featuring the manufacture of lubricating oil for steam turbines. Includes a pictorial description of the Gulf Alchlor process for refining lubricating oils.

Fire Protection 39
Pyrene Manufacturing Co.—16-page brochure illustrating and describing the use of air foam for use in fighting liquid fires. Application of air foam to various types of fires is illustrated.

Leather Belting 40
E. F. Houghton & Co.—Large-size wall chart covering all phases of "Care of Leather Belting." Includes detailed information on installation, operation, maintenance, etc. Covers such details as cutting leather belts, preparing surfaces, cementing, lacing. Includes engineering information on how to calculate belt speeds, belt sizes, pulley ratios, etc.

Control Equipment

Thermometers 41
The Philadelphia Thermometer Co.—Catalog No. 110 consisting of 64 pages of text and illustrations covering their full line of industrial thermometers, etched stem thermometers and thermal controls.

Instruments 42
The Foxboro Co.—20-page reprint entitled "Characteristics of Differential Flow Meters and Factors Affecting Their Operation." Contains illustrations, curves, and tables, together with application diagrams.

Pressure Control 43
Meletron Corp.—8-page booklet featuring pressure-operated switches which operate from 30 in. of Hg. vacuum to 5,000 lb. per sq. in. pressure for use in gas, steam, oxygen or oil systems.

Liquid Level Sight Gages 44
Jerguson Gage & Valve Co.—4-page leaflet illustrating the various types of liquid-level gages and specialties manufactured by this company. Specifications, sizes, and list prices are included.

Rotameter Tube 45
Catalog section 15-A describes the Bead-Guide Rotameter metering tube, published by Fischer & Porter Co. The guiding of the float is done by three ribs formed in the inner face of the tapered, corrosion resistant glass metering tube. The float position in opaque liquids is read with ease.

Electric Controls 46
Microswitch.—Bulletin No. 36. 16-page booklet describing the use of microswitches in gaging devices and in electrical controls. Construction and operating principles of this equipment are described.

Instruments 47
J-B-T Instruments, Inc.—Loose-leaf binder containing several bulletins which illustrate and describe the various types of instruments and testers.

bad news for Bacteria...

... but good news wherever food is handled—wherever dangerous bacteria might attack product quality.

Lo-Bax, the concentrated, fast-killing chlorine bactericide, helps prevent food spoilage and improves quality standards by rigidly controlling bacteria and sanitizing all surfaces with which food comes in contact.

Easy to handle—winter or summer—Lo-Bax kills bacteria almost instantly ... at amazingly low cost. It contains 50% available chlorine, dissolves quickly in water—hot or cold, hard or soft—to make clear rinse solutions. Order Lo-Bax from your supply house today!

The Mathieson Alkali Works (Inc.)
60 E. 42nd St., New York 17, N. Y.

LO-BAX

50% AVAILABLE CHLORINE

LO-BAX SPECIAL—a superior chlorine bactericide in granular form—packed in 2⅓-lb. bottles, ½ doz. to the case; and in 1-lb. bottles, 1 doz. to the case.

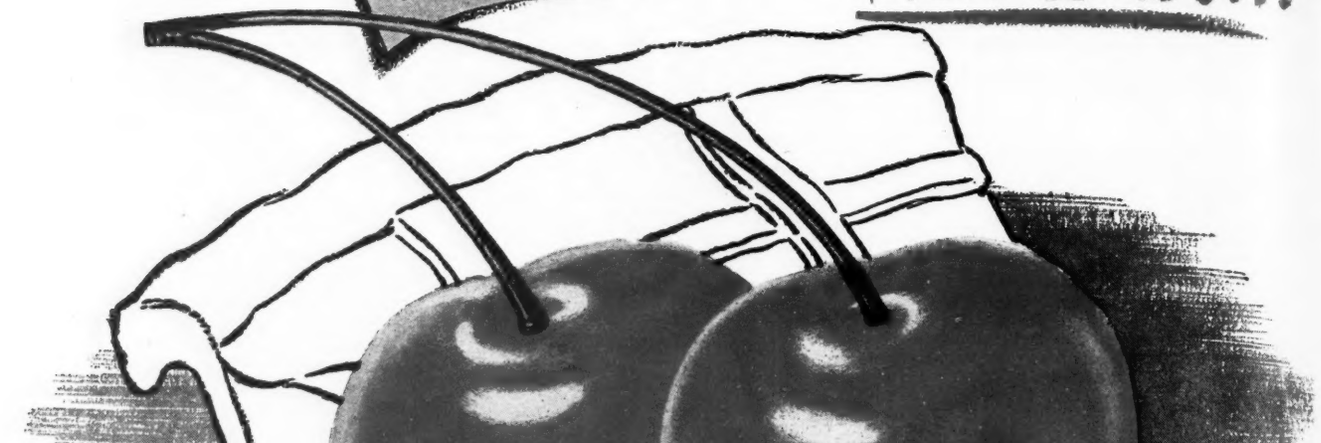
LO-BAX POWDER—a highly efficient chlorine bactericide packed in 1¾-lb. bottles, 1 doz. to the case.

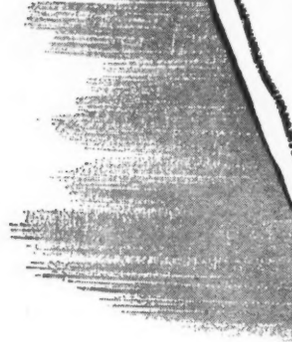
Mathieson
LO-BAX
CHLORINE BACTERICIDE

Lo-Bax ... Super-Nufos ... HTH-15 ... Dry Ice
Carbonic Gas ... Ammonia, Anhydrous & Aqua
Caustic Soda ... Soda Ash ... Bicarbonate of
Soda ... Liquid Chlorine ... Chlorine Dioxide
PH-Plus ... Synthetic Salt Cake ... Sodium
Chlorite Products ... Sodium Methylate

When Starch is in Supply

A PIE *thickener...*





for fruit fillings with a *Sun Ripened* color

PURITY "C" is actually a unique starch thickener. It permits fruit colors to stand out in all their sun-ripened brilliance. And it permits fruit flavors to retain their orchard freshness—free of the cereal taste found in straight corn starch.

Try PURITY "C". Let your customers convince you — that its all around superiority over straight corn starch — means increased fruit pie sales. They'll like the way it yields fruit fillings with a 'fresh-picked' color and flavor . . . with a soft texture that cuts and serves without spilling . . . with a creamy smoothness that never exhibits chunkiness.

And you'll like PURITY "C" because it yields superior fruit fillings — and cream fillings, too — without the aid of the extra sugar or other sweetening agents that would be required by straight corn starch.

PURITY "C" is another product of National's Food Laboratory research that has produced a specialty starch for every baking need. Kitchen tested recipes that have increased sales in bakeries, hotels and restaurants are now available in our PURITY "C" Booklet. Write for your copy — NOW!

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FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

FATS and OILS

Retarding Rancidity In Fats and Oils

A PROCESS for retarding the development of rancidity in nonstable vegetable glyceride oils and animal glyceride fats, such as lard, beef fat and hydrogenated cottonseed oil, has been patented. The invention is based on the discovery that the tendency of lard to become rancid is retarded by treatment with certain human digestive enzymes, including trypsin, pepsin and clarase, along with vitamin E, otherwise known as tocopherol. Other oils and fats are also well stabilized by the same treatment.

According to the invention, tocopherol and an enzyme, selected from the class consisting of trypsin, pepsin and clarase, are added to and mixed with the fat to be stabilized. It may be effected most economically by using concentrations of vitamins and enzymes from animal and vegetable sources rather than by using the purified forms. The proportions of vitamins and enzymes, and the manner of adding and mixing, may be varied.

Digest from U. S. Patent 2,397,920, issued April 9, 1946, on an application dated April 27, 1943, to M. R. Coe, Jr. and M. R. Coe, and assigned to the United States of America.

VITAMINS

Vitamin A Deterioration In Reinforced Oleo

IN order to ascertain how rapidly the vitamin A potency of fortified olemargarine would be lowered under commercial storage conditions, and under such refrigeration as might be found in retail markets, a carton containing 30 one pound packages was purchased. A sample from one of the packages was immediately assayed and found to contain 14,000 units vitamin A per pound. Each pound was quartered, rewrapped and replaced in the original box. Half of the lot was stored in a commercial storage at 10 deg. F. and the other half in a household refrigerator maintained at 38 deg. F. At two week intervals ¼-lb. portions were removed and examined for vitamin A content, peroxide number and titratable fatty acids, and the Kreis test was performed.

The reduction in vitamin A potency over a period of one year was in excess of 50 percent in some samples stored at 38 deg., and more than 35 percent in samples stored at 10 deg. F.

Assuming that the material is manufactured to contain 11,000 units per lb., and is kept in cold storage for 3 months, the vitamin A will, on the average, be reduced to 9,592 units. If the margarine is not kept in cold storage during the entire period, the potency may well be lower than 9,000 units per lb.

Data are given on vitamin A depreciation, change in peroxide number and Kreis test over the period of one year, and on the relation of peroxide number to vitamin A reduction.

Digest from "Vitamin A Deterioration in Fortified Oleomargarine," by E. B. Boyce, L. E. Filios and H. C. Lythgoe, *Quarterly Bulletin of the Association of Food and Drug Officials of the United States*, vol. 10, No. 3, 97-104, July, 1946.

FREEZING

The Role of Water In Freezing Foods

WATER occurs in foods in both the free and combined, or bound form. According to the theory, only free water is changed to ice at subzero temperatures, while the bound water is held in some form which, either does not freeze at the temperature employed in quick freezing, or, if it does, freezes to crystals of molecular size which do not rupture the tissue.

Once the methods of reducing the percentage of free water in foods, or the means of transforming it into bound water are known, there should be a decided improvement in the quality of many frozen foods.

The calorimetric method was selected for estimating the free and bound water in animal and plant tissues. The average percent of bound water at −4 deg. F. in 4 samples of small peas was 5.04, in 6 samples of medium peas 4.13 and in 9 samples of large peas 5.69. Golden Bantam whole grain corn contained 33.77 percent bound water. Green beans had very little, and rhubarb and spinach had none.

Data are given on specific heats of dry composite samples of fruits and vegetables, and of free and bound water of numerous fruits and vegetables.

Digest from "The Role of Water In Freezing Foods," by M. R. Daughters and D. S. Glenn, *Refrigeration Engineering*, 137-140, August, 1946.

BAKING

Use of Whole-Egg Powder In Making Sponge Cake

TEMPERATURE of the egg-sugar-water mixture, at the beginning of the beating period, is an important factor in the production of satisfactory sponge cakes from whole-egg powder. Several hundred cakes were baked from different lots of low-moisture spray-dried whole-egg powders. The other ingredients used were as nearly identical as possible. Tap-water was used for reconstituting the egg powder. The temperature of the ingredients was controlled.

Objective measurements included sp. gr. of the egg-sugar foam and of the finished batter, the weight and volume of each cake, and the tensile strength of slices from the

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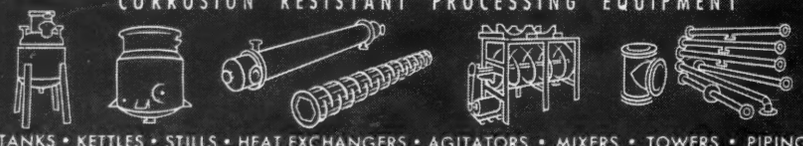

TANKS • KETTLES • STILLS • HEAT EXCHANGERS • AGITATORS • MIXERS • TOWERS • PIPING

cakes. The beating and mixing was done on an electric mixer, using a wire whisk and a 4-qt. bowl. Thermostatically controlled, ventilated gas ovens were used for baking. The basic formula was: Cake flour 40 g., granulated sugar 70 g., dried egg powder 26.2 g., salt 0.5 g., water 95 ml., lemon extract ½ tsp. Cream of tartar and baking powder were added in amounts varying from 0 to 1 g.

When the temperature of the egg-sugar-water mixture was around 140 deg. F., a lighter, more stable foam was formed, in a much shorter beating time, than if the ingredients were at room temperature. The variance, due to three levels of water (95, 100 and 105 ml.) used in the formula, and the two baking temperatures (375 deg. F. for 19 minutes and 400 deg. F. for 15 minutes), made no significant difference in the cakes. Different levels of cream of tartar greatly affected tensile strength, but not volume. The effect of baking powder upon volume was considerable. Cakes made from a formula in which 1 g. of cream of tartar and baking powder were used were generally judged preferable to those made from other formulas. Hence, a modified formula in which some baking powder is included is recommended if dried eggs are used for sponge cakes.

Digest from "Use of Spray-Dried Whole-Egg Powder in Sponge Cakes," by R. Jordan and M. S. Pettijohn, *Cereal Chemistry*, vol. 23, 265-277, May, 1946.

DAIRY

Lactic Acid Produced From Dairy Wastes

FERMENTATION of whey with *L. bulgaricus* on a commercial scale, was the object of an investigation in Sidney, N.S.W. It dealt with the optimum conditions including temperature of incubation, pH, degree of aeration, amount of starter and method of pasteurization. The influence of type of whey, concentration of lactate and fermentable carbohydrates were also studied.

Careful control of the process minimized contamination but did not reduce the period of fermentation below five days. Addition of bread yeast to the whey reduced the time to 1½ days by stimulating the rate of multiplication of lactobacilli. The stimulant could not be replaced by additional minerals, various nitrogenous substances or vitamins, although treatment with a mixture

(*Turn to page* 196)

even more nutritious

TODAY—progressive steps are being taken to secure better nutrition for all America.

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of thiamin, riboflavin and six amino acids was slightly beneficial.

Fermentation was accelerated by growing *L. bulgaricus* in association with a film yeast at 107 deg. F. Under commercial conditions, however, contamination was a problem at this temperature. Better results were obtained at 118 deg. F. with mixed starters containing short- and long-celled strains of *L. bulgaricus* which took 2 to 2½ days in the absence of yeast.

Digest from "Production of Lactic Acid I. From Whey," by R. J. Swaby, *The Journal of the Australian Institute of Agricultural Science*, vol. 11, no. 4, 179-185, December, 1945.

SANITATION

Vapors in Mold Control

FUNGICIDAL vapors emanating from solid substance would be useful in controlling mold infections. While not generally applicable to food products (although diphenyl is used on paper wrappers for citrus fruits) such vapors would have a place in laboratories, culture rooms, container storage spaces and other locations where molds might originate.

Forty-seven chemical compounds of widely different types were studied for their effects on several species of molds, including *Aspergillus* and *Penicillium*. The most effective materials were *p*-dichlorobenzene, and ethyl mercuric chloride. Benzaldehyde and *o*-chlorophenol, also showed promise. *m*-Cresyl acetate was not very effective although it has been recommended as a vapor-phase mold inhibitor.

Most of the compounds tested would be considered objectionable in the presence of foods, because of toxicity, or objectionable odor. They could be useful as fumigators in some cases.

Digest from "Fungistatic Vapors for Control of Mold in Packages and Equipment," by T. C. Scheffer and C. G. Duncan, *Industrial and Engineering Chemistry*, vol. 38, 619-621, June, 1946.

Control of Rodents and Scald in Apple Storage

CARBON DIOXIDE, used in high concentrations, may offer a relatively safe and cheap method of controlling apple scald and rodents in cold storage rooms. In experiments carried out at the Rhode Island Agricultural Experiment Station scald was controlled on Rhode Island Greening apples, which were placed in a 32 deg. F. storage immediately

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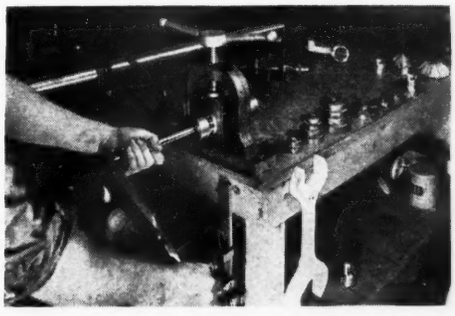

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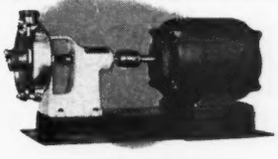

In addition to a complete sample display of TRI-CLOVER Stainless Steel and Trialloy Fittings and Valves, you'll also see the newest design in Pumps and Specialties.

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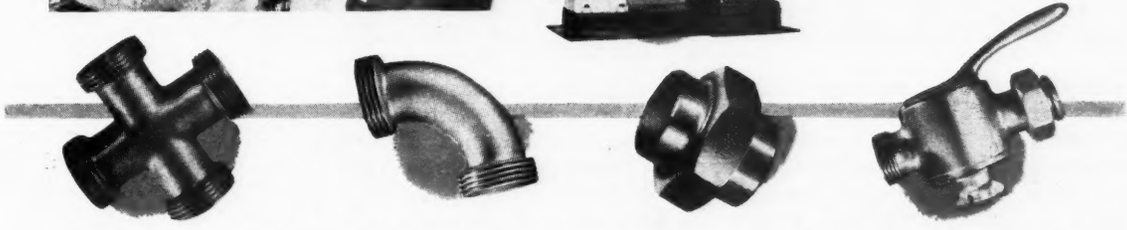

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2-K Bend	10-BF Valve	30-F Angle Valve
2-P Bend	10-C Valve	31-15 Reducer
7 Tee	13-H Hex Nut	32-15 Reducer
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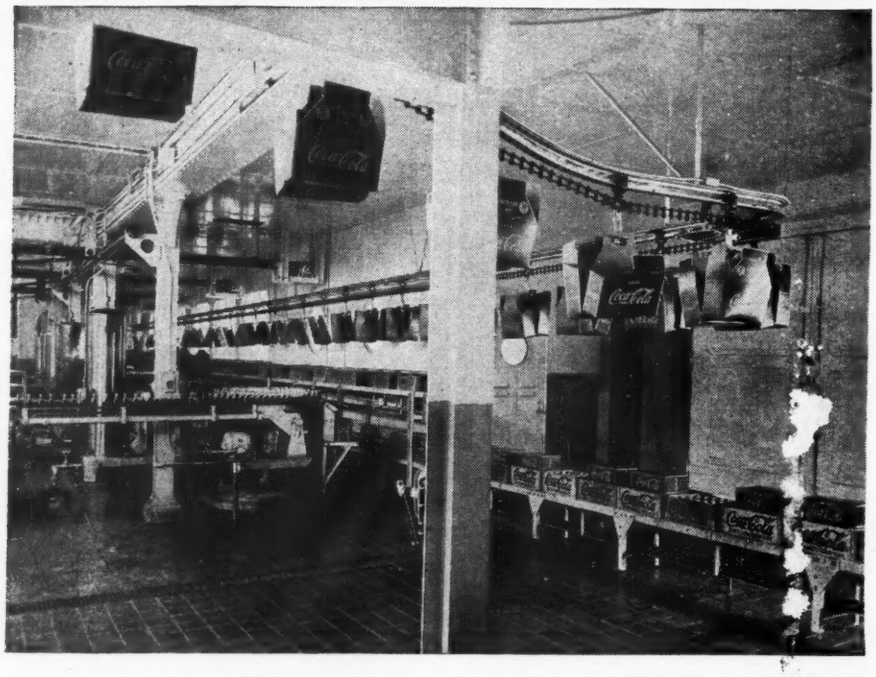

Trolley Conveyers are especially practical in busy, crowded plants where floor space is at a premium and the more common floor types of conveyer cannot be applied without sacrificing this much needed floor space. Trolley Conveyers, by means of transverse bends dipped down to working height at pre-determined points in the plant, can keep materials flowing steadily at a controlled speed. A variety of types of hooks and hangers add to the flexibility of Trolley Conveyer systems. There is a Mathews Engineer operating in your vicinity. He will be glad to have an opportunity to tell you about Trolley Conveyers, and about the many other types of Mathews Conveyers which have been engineered to serve production. Your inquiry involves no obligation. Write or wire for engineering service.

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after picking and exposed to air containing 30 to 60 percent CO_2 for as little as 3 days. The fruits, after treatment, were held at 32 deg. for 5 months and then removed to a room at 65 to 70 deg. F. for one week. At the end of this period scald was absent. Check fruits had 78 percent scald.

When white mice and Norwegian rats were exposed to concentrations of from 12 to 25 percent CO_2 in a 32 deg. F. storage room, it was found that a concentration of about 20 percent CO_2 would kill them in 3 to 5 hours.

It appears that 25 to 30 lb. of dry ice per 1,000 cu. ft. storage capacity will produce sufficient CO_2 to kill rodents. There are indications that rodents and scald can be controlled simultaneously by treatment with carbon dioxide.

Digest from "Pre-Storage Carbon-Dioxide Treatments For Control of Apple Scald" and "The Use of Carbon Dioxide For Controlling Rodents in Cold Storage Rooms," by S. A. Pieniazek and E. P. Christopher, *Rhode Island State Contributions*, Nos. 668 and 682.

ENGINEERING

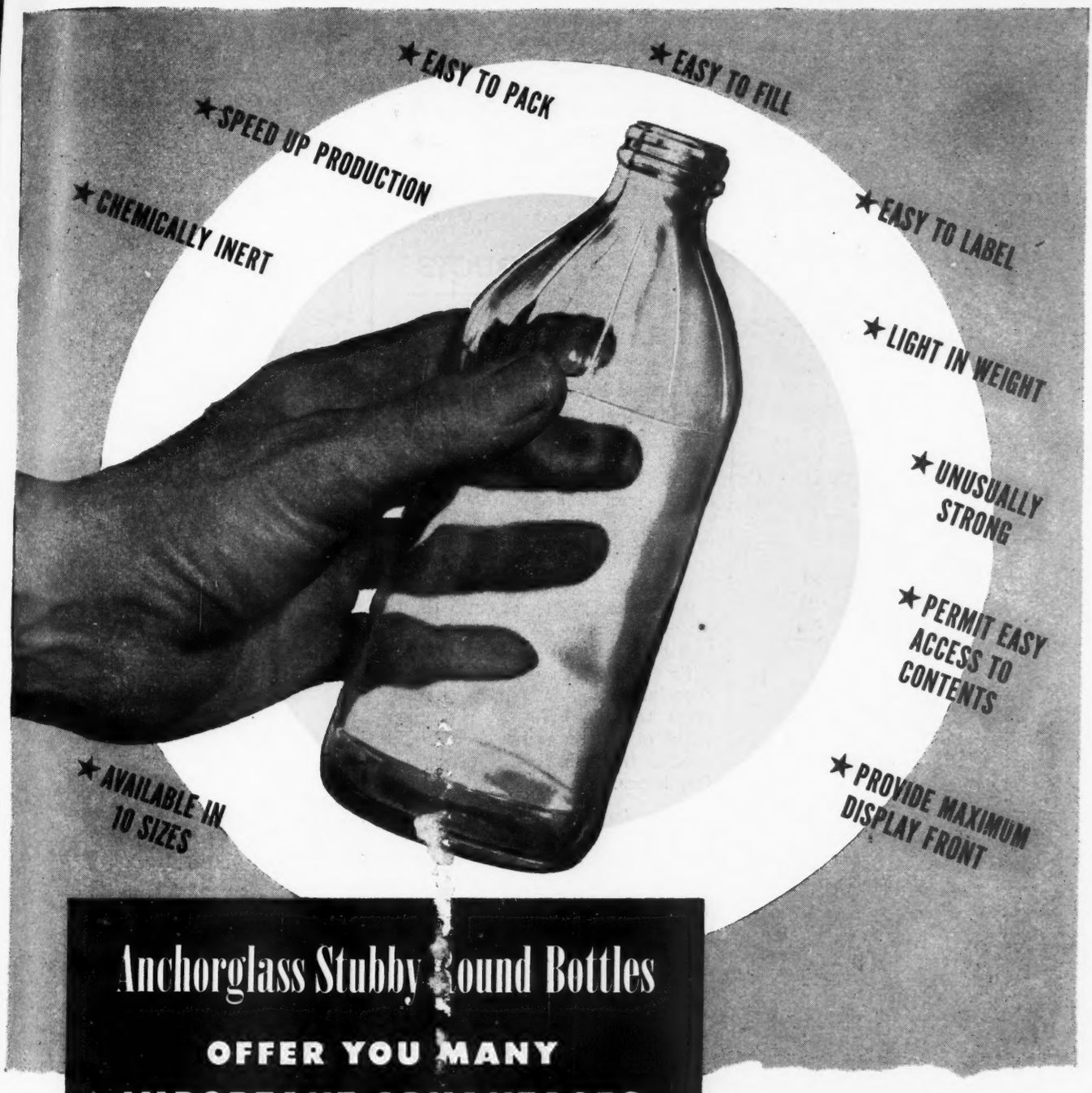
Proportioning Vitamins In Cattle Feeds

VITAMIN bearing oil, uniformly dispersed in a granular food product, by mixing a high content vitamin oil in water to form an emulsion, and then continuously spraying the emulsion on feed for fowl, cattle, horses or the like, is the subject of a recent patent.

The invention relates to the method and apparatus for proportioning the vitamin-carrying medium in the food product. By the use of a duplex proportioning pump, the water and vitamin carrier are forced through a homogenizing nozzle into a reservoir tank. Proportions of water to oil range from 80 to 98 percent water to from 2 to 20 percent vitamin-laden oil, depending upon the degree of concentration of vitamins in its carrier. The mixture is pumped from the reservoir through a needle valve, to an atomizing or spray discharge orifice. The spray nozzle is located in the feed mixer, which may be any of the common type used for mixing feed or foods.

Continuous agitation of the water and vitamin carrier in the reservoir tank is maintained by the flow from the homogenizing nozzle, which is directed into the tank immediately below the surface of the liquid.

It is often desirable to mix small quantities of other constituents,



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such as riboflavin concentrate, into feeds. This can be easily done, it is claimed, by dissolving or dispersing such soluble ingredients in the water before it is introduced into the proportioning pump.

Digest from U. S. Patent 2,395,067, issued February 19, 1946, on an application dated October 27, 1942, to A. C. Richardson, and assigned to California Packing Corp., San Francisco, Calif.

CEREAL PRODUCTS

Tannin Free Cocoa

ASTRINGENT substances, removed from cocoa by a heating and aerating treatment, are the subject of a recent patent. The method comprises the steps of roasting cocoa beans at a temperature not exceeding 165 deg. F. for 15 to 20 minutes, grinding them and subjecting the resulting liquor, while substantially free from sugar and other ingredients, to a heating and aerating treatment, the treatment to be given at 100 to 160 deg. F. for 3 to 6 hours.

By this method, it is claimed, chocolate liquor is completely freed from tannins before it is mixed with other ingredients, and the conche treatment is limited to a few hours.

Digest from U. S. Patent 2,398,945, issued April 23, 1946, on an application dated March 13, 1944, to George Lawton, Highgate, London, England.

MICROBIOLOGY

New Germicidal Ices

GERMICIDAL ICES, made by adding small quantities of germicides to water immediately before freezing, do not produce noticeable improvements in the keeping quality of iced fish.

At the Pacific Fisheries Experiment Station, ices were made with the following germicides: 0.05 percent of a mixture of chloramine *T* and sodium benzoate; chloramine *B* and chloramine *T* (0.067 percent); chloramine *B* (0.067 percent) plus sodium benzoate (0.067 percent); alkyl dimethyl benzyl ammonium chloride and colamino formyl methyl pyridinium chloride in concentrations from 0.0084-0.02 percent; 2-ethoxy-6, 9-diaminoacridine lactate (0.00067 percent); penicillin (100 Int. units per lb. of ice); sulphanilamide (0.01-0.02 percent); sulphathiazole (0.01 percent) and sodium nitrite (0.076-0.1 percent). The water was aerated during freezing and the ice was crushed

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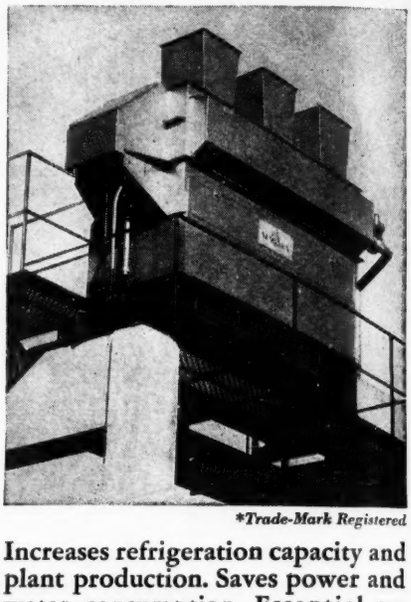

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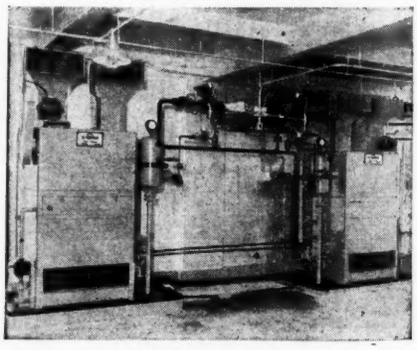

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Explosion Proof motors — protect against atmospheres charged with explosive dusts or gases. See specifications for specific kinds of explosive hazards.

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finely, well mixed and stored at 0 deg. F.

Results of the experiments showed that germicides are more effective in slightly acid than in neutral or slightly alkaline mediums, and that the flesh of the fish, although slightly acid normally, may be less acid in one species than in another. Sulphanilamide, sulphathiazole and sodium nitrite were more effective in retarding bacterial spoilage than were any of the other compounds studied.

Data are given on bacterial counts of fillets made from fish after 5, 7, 10, 12, 14 and 17 days storage in plain and germicidal ices.

Digest from "Germicidal Ices," by H. L. A. Tarr. *Progress Report of the Pacific Coast Stations*, No. 67, 36-40, June, 1946.

MATERIALS

Treatment of Tinplate

TINPLATE, treated by immersion in an oxidizing solution for 20 seconds at 185 deg. F., will withstand exposure to moist air or sulphur bearing food mixtures far better than untreated plate. Addition of dispersing or wetting agents to the treating solution improves the effect. The solution finally adopted contained 20 g. trisodium phosphate, 8 g. sodium dichromate, 20 g. sodium hydroxide and 3 g. wetting agent per liter. The tinplate was immersed in the solution for 10 to 60 seconds at 160 to 175 deg. F. followed by rinsing in water. The best wetting agents were sodium naphthalene sulphonate and sodium alkyl sulphate.

Cans treated for one or more minutes did not rust when exposed out of doors for over 16 days, or for a like period in a humidity chamber. Lacquered treated cans showed no rusting after 32 days. In the cannery the treatment can be given to unfilled cans if the interior needs protection or after filling if only the exterior is to be protected. In the latter case the cans should be washed before immersion in the oxidizing solution. Spraying the cans was also successful in protecting them against rusting.

The treatment of the interior of cans was effective when products such as meat dishes, soups, stews and beans were canned. There was no blackening of the cans and the tin content of the food was only 50 to 80 percent of similar products from untreated cans.

The oxidized coating withstands deformation making treatment of

POWDERED FOOD PROCESSORS . . .

. . . don't let your money vanish in thin air!

That often happens—*literally!* The air that's ejected from your food powder collector should certainly be thin—but is it thin *enough?* How much valuable food powder escapes into it?

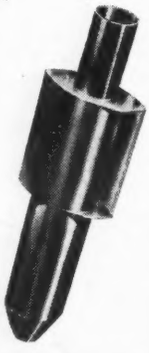
For example, in a recent instance a 1% increase in precipitating efficiency over the collector in use represented a saving of $20,000.00 per year per installation! Even a small increase in precipitation efficiency is large when expressed in terms of dollars.

Unless your present equipment is giving you efficiency percentages crowding the 100% mark, it will pay you to look into AEROTEC tube performance. An Aerotec assembly may be installed as a primary unit, or as a secondary in series with your present recovery equipment. In either case, the higher efficiency attained may result in astonishingly large savings.

Actual tests with Aerotec powdered food recovery equipment have shown efficiency ratings in the following percentages of reclamation.

Material	Percent Efficiency
Coffee	100.0
Cereal Dust	99.9
Powdered Milk	100.0
Soy Bean Powder	99.0
Peanut Dust	97.5

Let us test the efficiency of your present recovery equipment. It can be done easily and simply with the Aerotec Field Test Unit, using an actual full size Aerotec tube for accuracy. Our engineers will be glad to make this test and to recommend the means to increased efficiency wherever possible.



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Project and Sales Engineers
FIRST NATIONAL BANK BLDG., GREENWICH, CONN.

AEROTEC CO.
WHITE PLAINS, NEW YORK

CASE HISTORY No. 9

One in a series of factual experiences of a group of American manufacturers with Multiwall Paper Bags.

COST COMPARISON
(Per Ton)

	200-lb Burlap Bags (Second-hand)	50-lb Paper Bags
Container cost	$1.80	$1.35
Labor cost	.50	.15
Total bag and labor cost	$2.30	$1.50
Saving, paper over fabric		$.80

CLASS OF PRODUCT PACKED

CEMENT	FERTILIZER
CHEMICALS	FOOD
FEEDSTUFFS	MISCELLANEOUS ✔

PRODUCT CHARACTERISTICS

ABRASIVE	GRANULAR
CORROSIVE	HEAVY
DELIQUESCENT	HYGROSCOPIC
FLUFFY ✔	LIGHT ✔
FREE-FLOWING	VISCOUS

ST. REGIS BAG PACKAGING SYSTEMS are made in a variety of capacities, speeds, and manpower requirements to suit specific products and plant layouts. Machines are available in types to meet the special characteristics of a wide range of products, with filling speeds as high as twenty-four 100-lb. bags per minute—with one operator.

How a talc producer reduced his packaging costs

and "licked" dust at the same time

This 9th case history in a series of St. Regis Packaging System success stories tells how Cohutta Talc Co. of Dalton, Georgia, has improved working conditions and lowered packaging costs by using a St. Regis valve bag filling machine and multiwall paper valve bags.

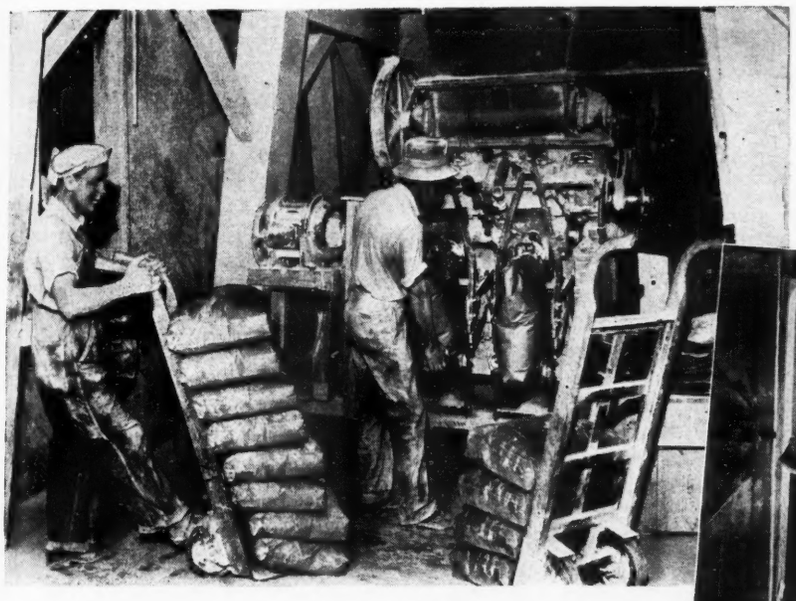
The product, formerly packed in bulky 200-lb. burlap bags, is now packed in easy-to-handle 50-lb. multiwall paper bags.

DUST IS CONQUERED — The St. Regis machine confines the dust during the packing operation and there is no siftage through the bag as in the case of burlap. So the dust problem was immediately eliminated from the packing operation.

BETTER WORKING CONDITIONS WELCOMED — Employees derived great satisfaction from the abatement of the dust nuisance as well as from working with the clean, easy-to-handle 50-lb. paper bags.

LABOR COSTS CUT 70% — A three man crew now packs ten tons an hour. This is *twice* the tonnage that a *five* man crew was able to pack in burlap. Labor cost dropped 70% . . . from 50 cents to 15 cents per ton packed.

TOTAL COST REDUCED — The Cohutta Company reports its per ton cost for burlap bags at $1.80 and for multiwall bags at $1.35 . . . a saving of 45 cents per ton. This, added to the saving in labor costs, results in an overall saving in packaging costs of 80 cents a ton.



(Left) One man operates the St. Regis 107-FC Packer, which simultaneously weighs and fills the 50 lb. multiwall bags.

(Right) Filled bags are easily moved by hand trucks and loaded in freight car.

ST. REGIS SALES CORPORATION

(Sales Subsidiary of St. Regis Paper Company)

NEW YORK 17: 230 Park Ave. CHICAGO 1: 230 No. Michigan Ave.
BALTIMORE 2: 2601 O'Sullivan Bldg. SAN FRANCISCO 4: 1 Montgomery St.

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Allentown Birmingham Boston Cleveland Dallas Denver Detroit Franklin, Va. Los Angeles Nazareth, Pa. New Orleans No. Kansas City, Mo. Ocala, Fla. Oswego, N. Y. Seattle Toledo

IN CANADA: St. Regis Paper Co. (Can.) Ltd., Montreal, Vancouver.

Without obligation, please send me full details regarding "Case History" No. 9, outlined above.

NAME_____

COMPANY_____

ADDRESS_____

THE *Original* WHEEL-EZY $10.25

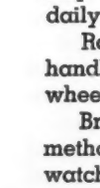
MODEL CK-45-NH NICRO STEEL WHEELS . .

WITH RUBBER WHEELS (MODEL CK-45-AGH) . . . $13.25

Here is the lightweight hand truck which gives you top quality at lowest price. Tremendously strong, *WHEEL-EZY* will carry as many as five loaded cases up and down steps, over ramps and thresholds with balanced ease. Simply hung on the truck, it can be lifted down quickly by the driver at each delivery stop . . . saves his energy and allows him to accomplish more daily.

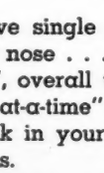
Rapids-Standard *WHEEL-EZY* trucks have single or double handles . . . open or solid "shovel-type" nose . . . with the wheel of your choice. Overall height 45½", overall width 20".

Break away from old-fashioned "case-at-a-time" handling methods! Put a *WHEEL-EZY* on every truck in your fleet and watch how quickly they pay for themselves.



OTHER WHEEL-EZY MODELS

Model CK-145-GP, (left) a single handle, solid or open nose type, equipped with General Pneumatic Wheels $19.95. Same type but double handle (Model CK-45-D-GP) $20.95 (right).



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Grand Rapids 2, Michigan

When solid nose is desired put figure "1" in model number, as "CK-145-NH".

Quantity	Handle: Single	Handle: Double
-------CK-45-NH	☐ $10.25	☐ $11.25
-------CK-45-AGH	☐ 13.25	☐ 14.25
-------CK-45-GP	☐ 19.95	☐ 20.95

All prices F.O.B. Grand Rapids, Michigan

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sheets prior to forming into cans entirely practicable. Electro-tinplate having 8 to 12 oz. tin per base box responds better to the treatment than 1¼ to 1½ lb. hot-dipped plate. There is some evidence that lacquers adhere better to the treated than to untreated plate, except for the phenolic-resin meat lacquers.

Digest from "A Protective Chemical Treatment for Tin Plate," by R. Kerr, *Journal of the Society of Chemical Industry*, vol. 65, 101-104, April, 1946.

MISCELLANEOUS

Salt Affects Beet Yield

SALT, applied as a side dressing to beets, within six weeks after planting, has materially increased the yield. Experiments in various parts of New York have proved that the addition of salt, at the rate of 500 lb. per acre, either drilled in before planting or applied as a side dressing within six weeks after planting, resulted in an increased yield of beets. The increase is large enough to be profitable under price relationships, which have existed during the past few years. The side dressing treatment was a little better than the earlier treatment. Table beets, sugar beets and stock beets were used. The three kinds are so closely related that salt benefits all three.

Digest from "Side Dressing Beets with Salt Gives Marked Results," by J. Shafer, Jr., and C. B. Sayre, *Farm Research*, 12-13, July, 1946.

Clarifying Apple Juice

LIMED APPLE JUICE treated with CO_2 or SO_2 to convert the lime to a quick settling, crystalline precipitate and the separation of this precipitate from the juice, is the subject of an invention recently patented.

According to the patent, the juice is limed to bring it to pH of about 8, and then, at a temperature sufficiently high to prevent separation of lime-sucrose compounds, CO_2 and/or SO_2 gas is bubbled through it. The lime is converted to a readily separable precipitate which is separated from the juice. The juice may be concentrated by evaporation and then gassed with one or both of the above gases to cause settling of a black liquid from the supernatant concentrate.

Digest from U. S. Patent 2,401,169, issued May 28, 1946, on an application dated January 31, 1944, to R. M. Laird, Rootstown, Ohio.

BOOKS

Metallic Soaps

THE ALKALINE EARTH AND HEAVY-METAL SOAPS. By Stanley B. Elliott. Published by Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y., 1946. 6x9¼ in.; 342 pages; cloth. Price, $7.50.

The manufacture, properties and typical applications of the alkaline-earth and heavy-metal soaps are discussed in this easily read volume.

If these soaps are to be fully utilized, a better understanding of the raw materials used and variations in manufacture is decidedly helpful. These are explained in the early chapters.

The applications are divided into three classes: (1) uses based on metal cation, (2) on the ability to influence characteristics of liquids and (3) on physical characteristics of the soaps. While many applications could not be discussed exhaustively, the book offers references to the literature whenever possible.

Plant Operation

CONDENSED MILK AND MILK POWDER, 6th edition, by Otto Frederick Hunziker, La Grange, Ill. Published by the author, March 1946. 6x9 in.; 494 pages; illustrated; cloth. Price, $6.50.

Organized primarily as a textbook, this edition serves a fourfold purpose.

It is essentially a plant operator's handbook in that it presents the latest commercial developments in milk condensing and drying methods, equipment and practice, summarizes scientific data pertaining to milk products and imparts information that is both scientifically dependable and industrially practical.

It supplies to the dairy industry student the fundamentals of technical, operating and management problems in sequence, gives him an over-all picture of the condensed and dried milk business and provides him with a source of factual information for future reference.

It aids the research worker to recognize the fundamental problems of milk condensing and drying. New problems and new aspects of old problems are suggested.

It is intended to acquaint Food and Drug Administration officials and their law-enforcing agencies with current practices and to promote a better understanding of the possibilities and limitations of helpful regulatory control.

An indication of the practical value of this book is found in the many illustrations it contains showing design and engineering details of equipment, flow diagrams and operating data. Supplementing the text material are an 8-page cross index and 55 pages devoted to catalog descriptions and illustrations of equipment.

The author is known throughout the milk processing field as the dean of dairy technologists. The sources from which he has obtained the information in this book are acknowledged and cited at the end of each chapter.

Enzyme Progress

ADVANCES IN ENZYMOLOGY, Volume VI. Edited by F. F. Nord. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y., 1946. 6½x9½ in.; 563 pages; cloth. Price, $6.50.

This sixth volume continues the mission of publishing critical reports that are described as being in the borderland between physiology, chemistry, microbiology and physical chemistry.

The food chemist will be especially interested in the papers on *The Bacterial Amino Acid Decarboxylases*, *The Actions of the Amylases*, and *The Amylases of Wheat and Their Significance in Milling and Baking*.

Instruments Galore

SCIENTIFIC INSTRUMENTS. Edited by Herbert J. Cooper. Published by Chemical Publishing Co., 26 Court St., Brooklyn 2, N. Y., 1946. 8¾x6¾ in.; 305 pages; cloth. Price, $6.00.

The user of scientific instruments may often wonder how the fellow in some other field makes his observations. This book will probably tell him. Instruments used in the laboratory, in the field, in industry, and in commerce are described and their principles discussed. The book is fully illustrated and should be worth the price to those interested in the subject. The devices range from the simple classical instruments to present day developments such as the electron microscope and the use of echo sounding. Titles of sections into which the book is divided include Optical In-

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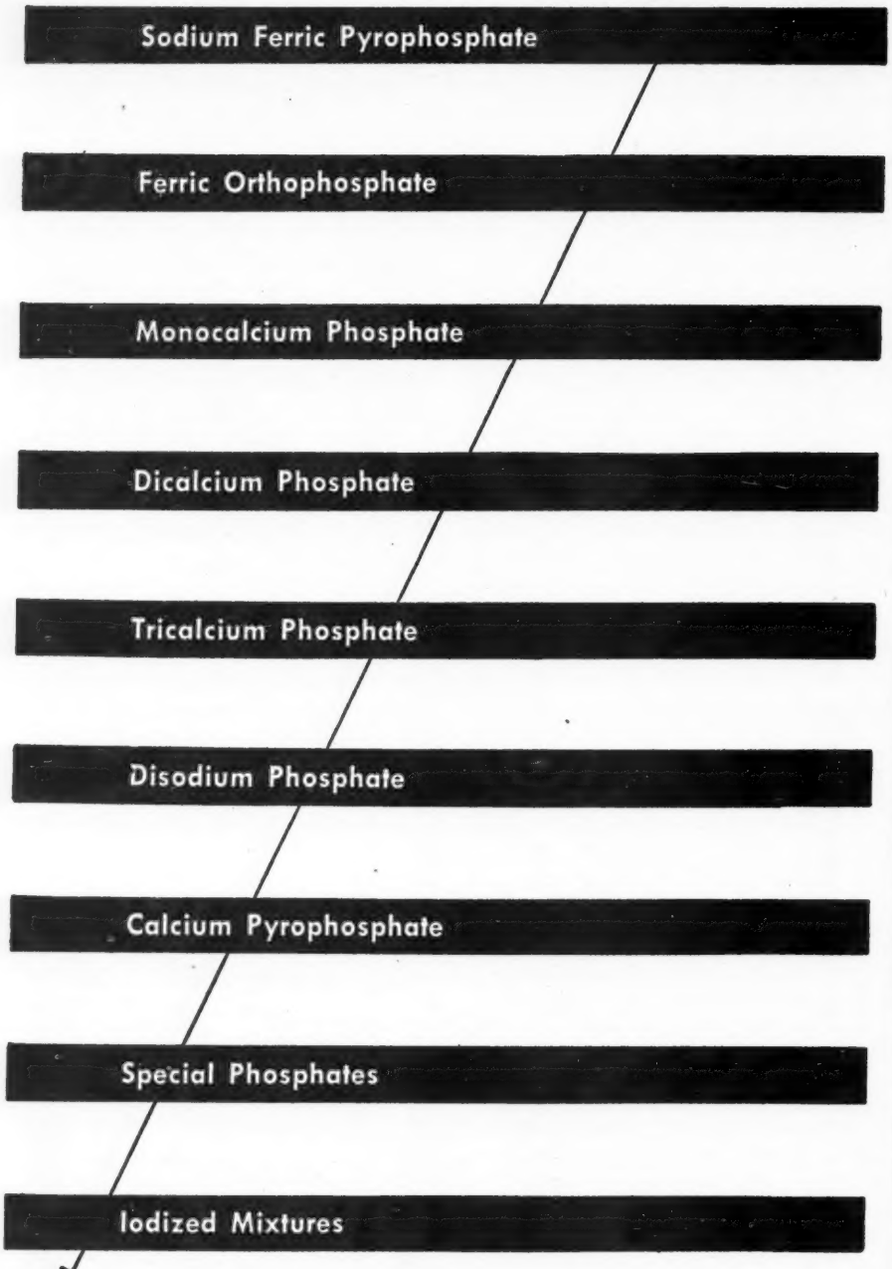

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struments, Measuring Instruments, Navigational and Surveying Instruments, and Liquid Testing. The presentation is a broad one, which may account for apparent omission of the specialized control instruments of the process industries.

GOVERNMENT PUBLICATIONS

THE following recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated the pamphlet is free and should be ordered from the bureau responsible for its issue.

INJURIES AND ACCIDENT CAUSES IN THE SLAUGHTERING AND MEAT-PACKING INDUSTRY, 1943. Bureau of Labor Statistics. Price, 15 cents.

SAVORY HERBS: CULTURE AND USE. By M. S. Lowman. Department of Agriculture, Farmer's Bulletin No. 1977. Price, 10 cents.

NUTRITIVE VALUE OF THE PER CAPITA FOOD SUPPLY, 1909-45. Department of Agriculture, Bureau of Human Nutrition and Home Economics. Mimeographed.

A STUDY OF THE PHYSICAL CHANGES WHICH AFFECT THE STORAGE LIFE OF EVAPORATED MILK. By B. H. Webb, E. F. Deysher and C. F. Hufnagel. Department of Agriculture, Bureau of Dairy Industry, BDIM-Inf-37. Processed.

READJUSTMENT IN PROCESSING AND MARKETING CITRUS FRUITS. Bureau of Agricultural Economics, Washington 25, D. C.

"FISHERIES." Report of the Technical Committee on Fisheries. Food and Agriculture Organization, 2000 Massachusetts Ave. N. W., Washington 6, D. C.

WORLD FOOD SURVEY. Food and Agriculture Organization, 2000 Massachusetts Ave. N. W., Washington 6, D. C.

PROPOSALS FOR A WORLD FOOD BOARD. Food and Agriculture Organization, 2000 Massachusetts Ave. N. W., Washington 6, D. C.

CHANGES IN FARMING IN WAR AND PEACE. By Sherman E. Johnson.. Bureau of Agricultural Economics, FM-58, Washington 25, D. C.

SUGAR DURING WORLD WAR II. By Roy A. Ballinger. Bureau of Agricultural Economics, War Records Monograph-3, Washington 25, D. C.

PATENTS

ENGINEERING

Filled Cans With Abnormal Internal Pressures Mechanically Detected and Automatically Removed From Continuous Packing Line—Roy O. Henszey and Paul Smart, to Carnation Company, Oconomowoc, Wis. No. 2,400,507. May 21, 1946.

Natural Bond Between Fruit Pit and Fruit Meat Mechanically Broken By Stopping Rotation of Pit As Fruit Rotates About Axis of Pit—Ralph Polk, Sr., and Ralph Polk, Jr., to the Polk Development Co., Tampa, Fla. No. 2,402,181. June 18, 1946.

Nuts Cracked While Subjected to Continuously Increasing Pressure Between Two Sets of Radially Related Knives—William F. Grupe, Lyndhurst, N. J., to Brazil Babassu Corp., New York, N. Y. No. 2,405,303. August 6, 1946.

Nuts Mechanically Blanched During Passage Along Pair of Sloping Rolls Whose Upper Surfaces Rotate Away From Each Other—Harvey P. Curlee, near Charlotte, N. C. No. 2,405,292. August 6, 1946.

Vegetables and Other Edibles Blanched in Series of Closed Chambers Designed to Move Continuously Along Production Line With Edibles—Douglas M. McBean, Rochester, N. Y. No. 2,403,871. July 9, 1946.

MEATS and FISH

Casings Stuffed with Sausage and Linked by String Mechanically Applied and Cut—James J. Prohaska, to Industrial Patents Corp., Chicago, Ill. No. 2,406,163. Aug. 20, 1946.

Fish Skinned by Mechanical Means—Charles M. Savrda, Bay Shore, N. Y., to Atlantic Coast Fisheries Co., New York, N. Y. No. 2,406,907. Sept. 3, 1946.

Large Pieces or Cuts of Meat Packed In Mold for Quick-Freezing and With Intimate Contact With Inner Surface of Mold Walls—James Arnold Brewster and Enrique Francisco Fernandez, Buenos Aires, Argentina, fifty percent to Smithfield and Argentine Meat Co. Ltd., West Smithfield, London, England, and fifty percent to Corporation Argentina De Productores De Carnes, Buenos Aires, Argentina. No. 2,402,121. June 18, 1946.

STARCH and SUGAR

Maltose Polymerized by Heating Under Substantially Anhydrous Conditions in Presence of Boric Acid Catalyst—Gerald John Leuck, Evanston, Ill., to Corn Product Refining Co., New York, N. Y. No. 2,400,423. May 14, 1946.

Stable, Modified Starch Paste Made By Partially Hydrolyzing Starch-Water Suspension and Heat-Treating in the Presence of 0.5 to 25 Percent Water-Soluble Condensate of Urea, Melamine, and Formaldehyde—Sivert N. Glarum, Ardmore, Pa., and Joseph J. Thomas, Portland, Me., to Rohm & Haas Co., Philadelphia, Pa. No. 2,400,820. May 21, 1946.

Starch Made Free of Thermophilic Bacteria by Roasting With Initial Moisture Content of Not to Exceed 3 Percent at About 240 to 260 Deg. F. for 1 to 3 Hr.—August J. Bulfer, Berwyn, Ill., to Corn Products Refining Co., New York, N. Y. No. 2,401,813. June 11, 1946.

Sugar Juice Clarified in Continuous Manner—George A. McBride, Barrington, Ill., to Infilco Inc., Chicago, Ill. No. 2,405,315. August 6, 1946.

Sugar Solutions Clarified By Treatment With Hydrogen Zeolite Preliminary to Mechanical Removal of Precipitate and Further Treatment of Juice With Anion Exchange Material—Hilding B. Gustafson, Hinsdale, Ill., and Lewis A. Paley, Glen Ellyn, Ill., to Infilco, Inc., Chicago, Ill. No. 2,402,960. July 2, 1946.

VITAMINS

Oil and Vitamin-B Content Recovered from Fish Viscera by Means of Pepsin Digestion—Ivan A. Parfentjer, Nannet, N. Y. No. 2,406,249. Aug. 20, 1946.

Vitamin-B Complex Tablets Made to Contain High Percentage of Amphoteric Milk Protein—Walter A. Compton and Richard S. Nicholls, to Miles Laboratories, Inc., Elkhart, Ind. No. 2,406,741. Sept. 3, 1946.

MISCELLANEOUS

Potatoes, Carrots and Like Heat-Treated for Peeling Without Being Subjected to Combustion Gases or Heat Producing Flame—George T. Hemmeter, Berkeley, Calif., to United States of America. No. 2,403,923. July 16, 1946.

Sweet Potatoes Cooked, Extruded and Toasted at About 270 Deg. F. Until Crisp — Lamar Mims Ware, Hubert Harris, and William Aubra Johnson, Auburn, Ala., to Alabama Polytechnic Institute, Auburn, Ala. No. 2,401,392. June 4, 1946.

Vegetable and Animal Material Subjected to Influence of Electrical Field and Tension of Not Over Twenty Millivolts During Extraction Process—Charles Reid, Edgware, England. No. 2,400,951. May 28, 1946.

Winery Still Slops Concentrated for Removal of Potassium Acid Tartrate Preliminary to Combining with Pomace and Drying—Ellis C. Pattee, Cincinnati, Ohio, to National Distillers Products Corp. No. 2,404,398. July 23, 1946.

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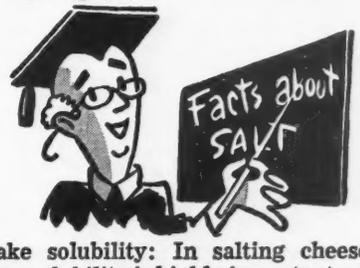
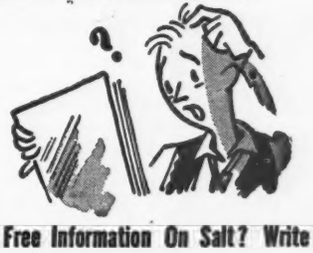
Teacher!

● Maybe you're like a lot of food technologists and salt buyers who have gone along thinking all salt is the same. Actually, of course, various brands and grades and grains of salt differ in many respects.



Take solubility: In salting cheese, slow solubility is highly important and desirable. Otherwise, salt is lost in the whey, producing flat, under-salted cheese. On the other hand, in salting butter, salt must dissolve with lightning speed. If the butterfat is on the soft side—lacking in body—at certain seasons, butter salt must dissolve so quickly that over-working is avoided. Otherwise, the butter may lose its desirable physical properties and become mottled or marbled—and may lose its moisture, become leaky. Yet, if the salt is not properly dissolved, the butter may be gritty.

To meet these problems, we have set up definite solubility standards for Diamond Crystal Salt. Our Butter Salt, for example, dissolves completely in water at 65° F. in less than 9.8 seconds—average rate, 9.2 seconds. That is why so many quality-minded food processors have learned to depend on Diamond Crystal products, manufactured under strict quality-control standards for solubility rate.



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If salt solubility enters into your processing, write to our Technical Director. He will gladly recommend the correct Diamond Crystal Salt for best results. Diamond Crystal, Dept. J-12, St. Clair, Michigan.

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"GEE, YOU CAN READ IT FROM WAY UP HERE!"

All right—we are exaggerating. We'll admit that even this newest Palmer Thermometer at street level could hardly be read from the top of a skyscraper.

But it's not such a terrible exaggeration at that. The "Red-Reading-Mercury" column in this new and finer Thermometer *can* be read more accurately—at a far greater distance than the ordinary instrument, even through smoke, steam and mist!

That's because the new Extruded Brass Case NOW makes possible a much larger reading scale. Other important features are: Double-strength, non-rattling glass shield; "Snap-On" cap for easy removal of shield; fume-resistant and dust-proof case. For full details write for Bulletins No. 46-2 and No. 46-3.

AND REMEMBER — specify this new thermometer on original equipment purchased from your jobber or equipment manufacturer—there should be no extra charge!

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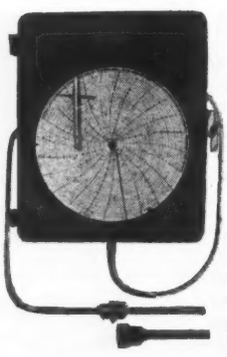

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Extremely Accurate and sensitive. Constructed for long service. Mercury Actuated. 12 in. die-cast aluminum case. Flexible armoured tubing and bulb of stainless-steel. All ranges up to 1000F. or 550C.

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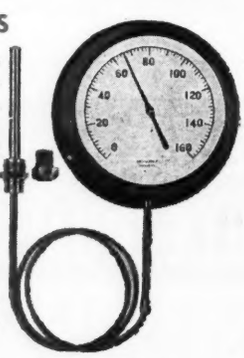
Mercury Actuated. 8 in. case. Very sensitive. Permanent accuracy guaranteed. Built for long life. Flexible armoured tubing and bulb of stainless-steel. All ranges up to 1000F. or 550C.



PALMER THERMOMETERS INC.

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Canadian Plant: King and George Sts., Toronto 2

Foods in Germany

(*Continued from page* 85)

Ersatz Coffee

Up to 1943, when stocks of the genuine product were exhausted, Kaffee Handels AG was also the biggest coffee roaster in Germany. This company's substitute was typical, and totally lacking in stimulant properties. It carried the trade name of "Arosta" and was a blend prepared after roasting the following individual ingredients:

a. 40-60 parts sugar beet, chopped whole and dried.
b. 40-60 parts rye or barley, dry grain.
c. 10 parts roasted chicory, with caramelized sugar color added for desired effect.

Each of the ingredients was roasted separately in closed drum-roasters of 600-800 lb. capacity. The beets were roasted between 30 and 45 minutes, depending on moisture and sugar content; the rye or barley, 20 or 30 minutes.

Then the blend was made and, while in the mixer, the caramel color added and thoroughly dispersed. After that, the whole mass was cracked and ground in a coffee mill (made by Krupp-Grusonwerke, Magdeburg). Packing was in paper-lined bags for distribution to the grocery stores, which rationed it to the civilians in smaller paper bags or jars furnished by the customer.

As a sidelight—roasted soy beans were not used because there was never a great enough supply.

Production today is cut to fit the pattern of rationing. I'm told it runs some 2,800 metric tons monthly for all of Germany. I couldn't get any indication of what it could be—or what it was before or during the war.

—End—

How To Get A Job

(*Continued from page* 73)

centage is decidedly in your favor, which is all you can ask for anyway.

The Interview

If, after your letter has been received, you are asked to come in for an interview, you'll know that your shot came pretty close to being a bull's-eye.

When you come to the point of being given an interview, you may be inclined to think that your work is over. Nothing could be further

Leakproof SILBRAZ* *joints*

IN COPPER OR BRASS PIPE

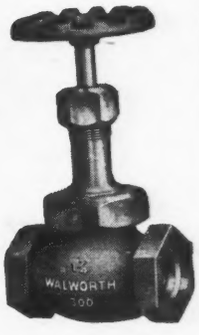
with WALSEAL* fittings, flanges, valves

WALSEAL UNION

WALSEAL 90° ELBOW

WALSEAL Y BRANCH

WALSEAL TEE



WALSEAL GLOBE VALVE

WALSEAL CROSS

WALSEAL OPEN RETURN BEND

WALSEAL COUPLING

WALSEAL FLANGE

This illustration shows only a few of the many Walseal valves, fittings, and flanges made by Walworth.

Silbraz joints are the strongest joints that can be made on brass or copper pipe or tubing They cannot creep or pull apart under any temperature or pressure which the pipe or tubing itself can safely withstand.

Silbraz joints are easily made with an oxyacetylene torch. When alterations to the line are necessary, Silbraz joints can be taken apart by reheating with the torch The Walseal valves or fittings used for making Silbraz joints may be re-used in the same or a new position. Enough alloy usually remains in the insert groove of the valve or fitting to permit a second Silbraz joint to be made, without the necessity of inserting additional alloy.

Walseal valves, fittings, and flanges for making Silbraz joints are a modern development of the Walworth Company—manufacturers of valves and pipe fittings for more than a century. For detailed information about Walseal products, write for Circular 84. For information on Walworth's complete line of valves, fittings, and pipe wrenches write on your company letterhead for a free copy of Catalog 42.

*Registered trade marks

One-Piece PIPE LINES

The above illustrates the details of a Walseal tee and Silbraz joints. The center port has been cut away to show the ring of silver brazing alloy which is inserted by the manufacturer in the ports of every Walseal product

The right-hand port has been cut away to show the penetration of the alloy after the pipe and fitting have been silver brazed.

The left side of the tee shows the fillet of silver brazing alloy which completely encircles the pipe at the juncture of pipe and fitting—indicating that the Silbraz joint is completed. Because the brazing alloy penetrates both pipe and fitting, the resulting Silbraz joint actually makes the pipe and fitting into a one-piece pipe line.

WALWORTH

valves and fittings

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NUKEMITE is a synthetic resin compound which is applied by conventional brush or spray methods. It rapidly air dries to form an attractive leakproof film of strong adhesion and durability. The corrosive action of strong cleaning compounds, fruit, lactic, malic and commercial acids or alkalies and most solvents will not affect a NUKEMITE coated floor surface in the slightest.

NUKEMITE also provides unexcelled and economical protection for chemical process tanks, structural work, piping and other types of equipment. A complete NUKEMITE Trial Kit is available at $2.95. Descriptive booklet mailed on request.

NUKEM Nukem *Products* CORP.
108 COLGATE AVE., BUFFALO 20, N. Y.

from the truth. The fact of the matter is that this is the time when you must be most alert, most skilled in selling yourself, for the interview is the last link in the chain you have been making. If it breaks down, if the favorable impression you have created in your letter is not carried through, you have no other recourse but to start again.

Consequently, when you sit down across the desk from your prospective employer, realize that you must use this time to good advantage. Be alert in manner and speech. Be able to explain your fitness for the job without self-consciousness and with understanding of both the job and what you have to offer. It is necessary to be able to give this information to the employer in an easy way, rather than to expect him to drag it out of you. Here again, try to put yourself in his place. Answer his questions directly but do not go on and on after you have covered the point.

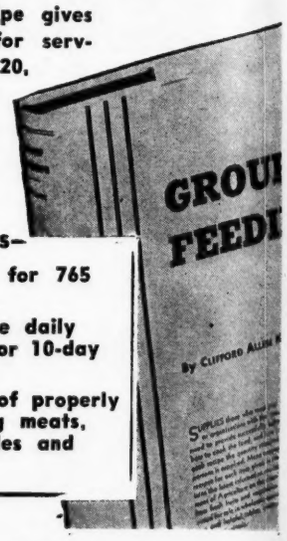
Don't forget such apparently obvious fundamentals as being on time for the interview, or being well groomed. Have you had a haircut recently, manicure, shoeshine and shave? Is your suit pressed? Is your shirt fresh and are you wearing a proper combination of clothes? Have you remembered to park your gum outside the office and also your cigarette? And will you remember not to slouch down in the chair you are offered, but instead to sit up straight and look alert and interested? Unquestionably they are all little things, and if you are a Steinmetz or an Edison, and your prospective employer can be guaranteed of your genius, these little things won't count. If such is not the case, however, all these little things contribute to the employer's impression of what you are and this impression counts heavily either in your favor or against you.

You should have fairly accurate ideas of salary values for the job in question and if, as will probably be the case, you are asked concerning salary expectations, you should be able to set a figure that is a fair estimate of your worth in the job.

Always remember that you have a better than even chance of selling yourself to the employer at the interview. You would not have gotten that far unless he was definitely interested in what you have to offer. Consequently, take advantage of that fact and use the minutes that you have been given at his desk with all the care and skill at your command. If you do, you can't miss.

How to plan, purchase and prepare food for *groups of any number*—

• **Each recipe gives quantities for serving 5, 10, 20, 50 and 100**



Supplies—

- **Recipes for 765 dishes**
- **Complete daily menus for 10-day periods**
- **Details of properly selecting meats, vegetables and fruits**

This helpful manual supplies a complete guide to planning, cooking, and serving proper, balanced meals to any number of people, from 5 to 100. It shows you how to buy the food, how to maintain the strictest economy and still supply the proper balance of food values, and how to operate and maintain a large mess hall or dining room efficiently. It provides specific menu suggestions in index form, and gives the recipes for each item suggested in the menus. A chapter on nutrition explains carefully the fundamentals of a well-balanced diet, and shows you all the foods which must be in every diet, and the proper quantities of each. Each recipe is broken down into quantities for 5, 10, 20, 50 and 100 person servings.

Just published!

GROUP FEEDING
BY CLIFFORD ALLEN KAISER

Second edition. 475 pages, 6x9, 11 tables, $5.00

This completely practical food-planner's guide supplies all the information which will enable you to operate a highly efficient and satisfactory dining hall or mess easily, economically, and scientifically. It supplies a number of special handy details, such as tables showing how fresh fruits and vegetables and canned foods are packed or crated for sale in wholesale quantities, and the latest information available from the United States Department of Agriculture on the vitamin contents of food.

34 Chapters cover every step of meal planning and cooking:

—nutrition
—menu planning
—buying dried fruits
—buying fresh fruits
—buying fresh vegetables
—buying fresh meats
—cooking terms and methods
—breakfast fruits
—cereals
—eggs and egg dishes
—griddlecakes and waffles
—first courses
—soups
—beef
—lamb and mutton
—pork
—veal
—miscellaneous meats
—poultry
—sea food
—cheese dishes
—starchy vegetables
—watery vegetables
—protective vegetables
—gravies and sauces
—stuffings
—salads
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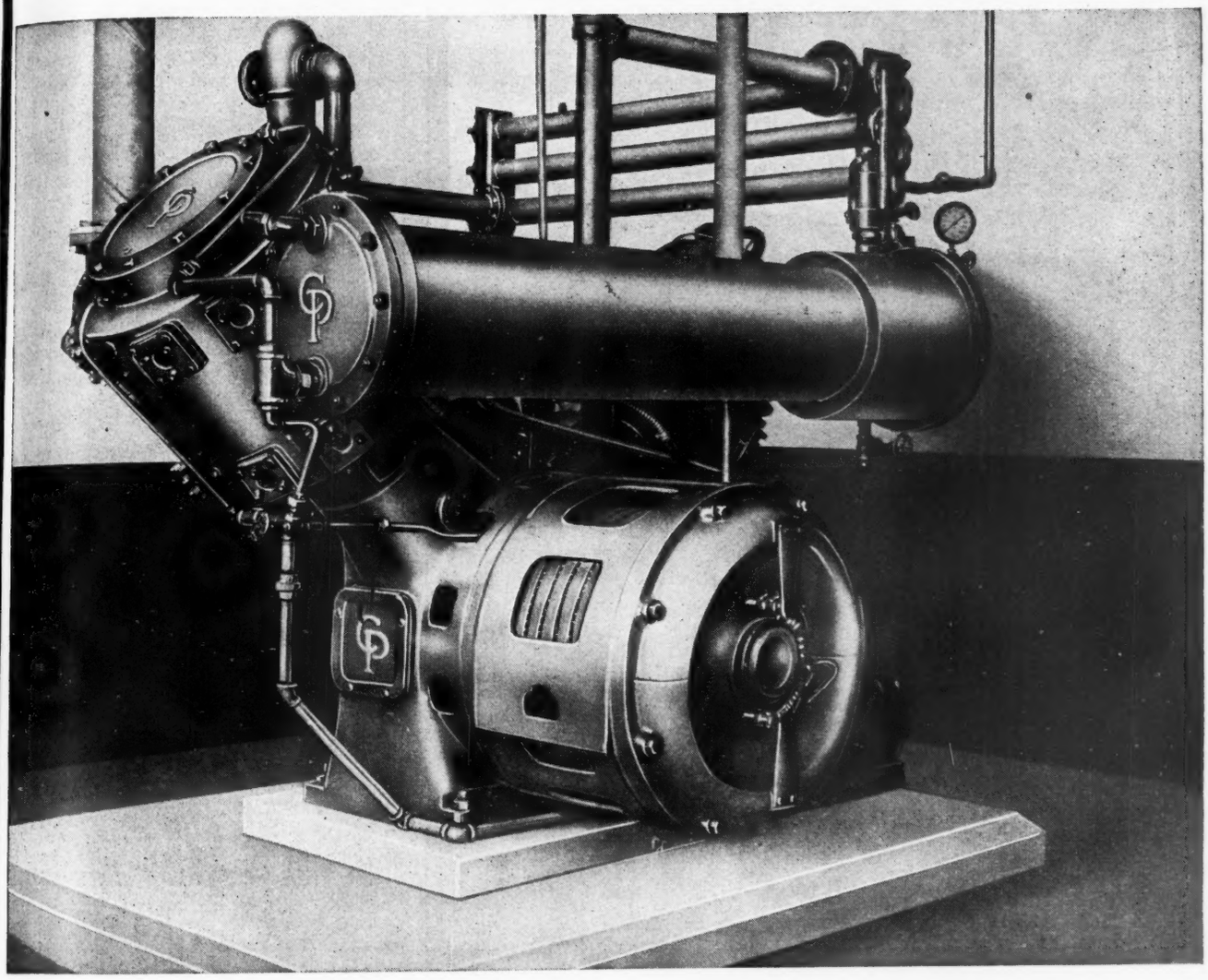

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COLONIAL HEAT & LIGHT ICE CO.

Roanoke Ice & Cold Storage

ROANOKE, VIRGINIA

Review the Results

After an interview, try to make a constructive analysis of the results. What could you have done to put across your story more effectively? Did the employer raise important questions you should have been prepared for, but were not? If so, how are you going to deal with such questions when asked again, as they undoubtedly will be? And by way of interpolation, it might also be remarked that you should never forget to write a letter of thanks to the employer after the interview, expressing appreciation of the time he has given you, for while this is the courteous thing to do, it is frequently neglected. Use your analysis of the interview as a constructive measure and it will be of benefit to you upon the next occasion you face a prospective employer.

Once you have secured the new job, retain your interest in the doings of the industry, keep up with the trade journals and expand your knowledge of, and contact with, the men who are doing things in your field. You will find that time and effort spent in such activities pay many dividends.

As Sir Philip Sydney wrote some centuries ago: "Who shootes at the midday Sunne, though it be sure he shall never hit the marke, yet it be sure he shall shoot higher than who ayms at a bush."

—End—

New Cleaning Devices

(*Continued from page* 78)

cleaning sanitary pipe is somewhat larger in diameter than that of the inside of the pipe, the bristles are tough and enduring, and it is so designed that cleaning solution can freely intermingle with the bristles during scrubbing. So far, this brush has been used only experimentally, but it seems to hold good promise.

The newly designed brush for cleaning sanitary fittings has a metal shank which, unlike the wooden shank of the brush originally used, will not break except under extreme abuse. This brush will do a better job than the original brush which, however, scrubbed satisfactorily.

During the development of the new cleaning aids, working models were made, tested experimentally, and then tested under plant conditions. Where advisable, these mod-

ALLIS-CHALMERS OFFERS

4-Way Help

FOR THE MILLING AND PROCESSING INDUSTRY

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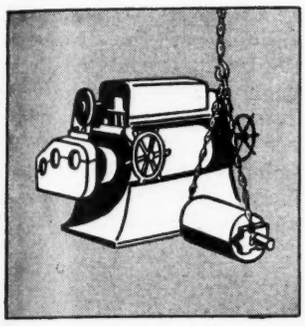

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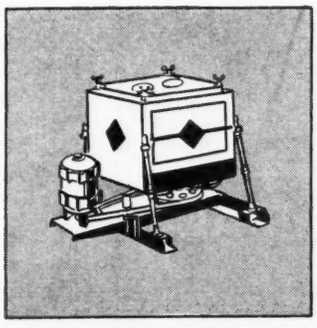
Today's critical food shortage is placing heavy demands on U. S. milling and processing plants. Wartime's peak production must be *continued* into peacetime — with no time out for complete plant checkups. A-C pledges its aid in keeping *your* mill running at full capacity. We urge you to plan *ahead* for all repair parts needs . . . but place orders *now!*



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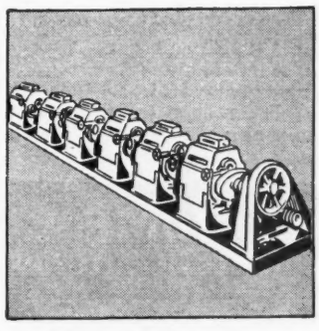
Replacement of individual units in your milling plant can result in *new* efficiencies, *greater* economies. A-C's line of milling and processing equipment is *widest in the world* . . . includes: rollers, grinders, high speed — low speed sifters, flaking machines, coolers, dryers, packers . . . a complete line for every requirement. Also tailor-made *special* units.



3. MODERNIZATION

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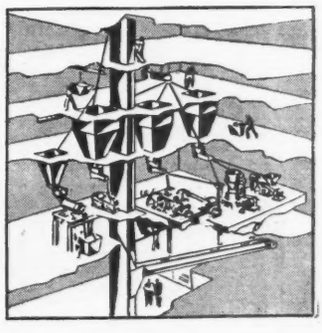

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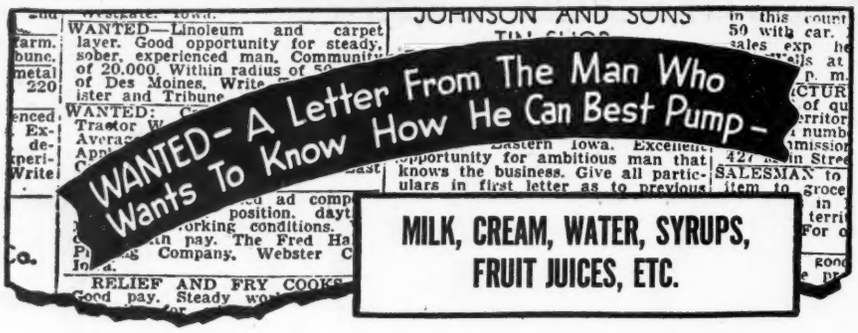
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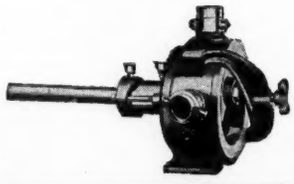

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els were changed and refined. Finished models include the features of the working models and certain construction refinements. They are built according to specifications carefully worked out during the course of their development and testing. It is highly important that these specifications be followed exactly if the equipment is to give satisfactory results.

In connection with the development of the new cleaning aids the writer wishes to express his appreciation to the National Dairy Corporation, who underwrote the project on cleaning; to Mr. H. F. Judkins, president of Sealtest, Inc., for his patient and wise help; to Mr. A. H. Bayer, director of research and production of General Ice Cream Corporation, in whose plants working models were tested, for his active support and encouragement; to Mr. N. J. Devereaux, plant engineer of the Rochester, N. Y. plant of General Ice Cream Corporation, for the help he gave; and to the plant managers, superintendents and workmen in our various plants for their assistance and cooperation.

—End—

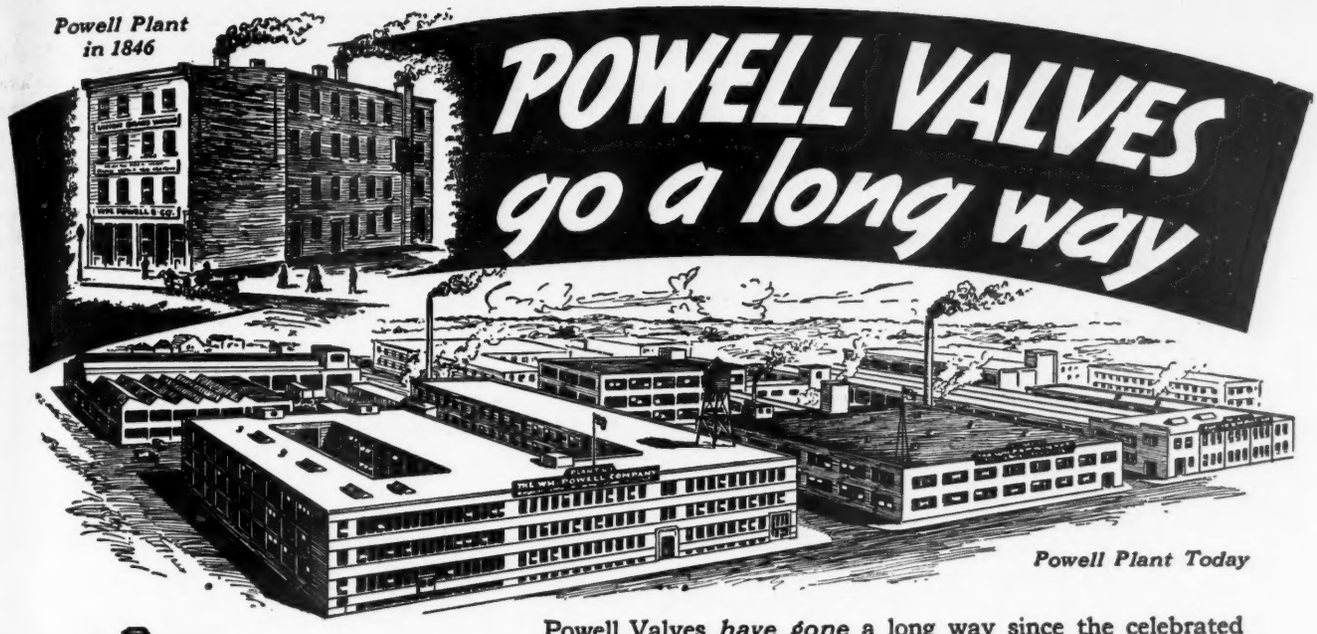
Filleting Machine

(*Continued from page* 90)

Knife sharpening requires approximately one-quarter man-hours' work. One pair of knives must be sharpened twice a day and a second pair once. The remaining three pairs of knives need only be sharpened after about one million pounds of fish have been filleted. Automatic sharpening devices for the high-speed rotary cutters, which are the ones that require daily sharpening, have already been designed. These will enable operators to sharpen rotary knives in approximately one minute.

Improved Sanitation

With the machine set up in a tiled room and above a center drain, filleting operations can be conducted without the customary slop, slime and offensive odors ordinarily associated with filleting operations. The machine is compact, built of non-corrosive material and equipped with a flushing system, capable of completely flooding it with water. Output of the flushing system amounts to about two barrels of water a minute. This water cascades on the machine and washes all fish debris resulting from cutting operations. Metals used in the machine



Powell Valves *have gone* a long way since the celebrated Powell "Star" Regrinding Globe Valve was patented in 1865.

Today, with a notably complete line of valves, which includes every required type, size and design—in bronze, iron, steel and many corrosion-resistant metals and special alloys—Powell Valves *are going* a long way in meeting the flow control requirements of modern industry.

Above all, Powell Valves *go* a long way in actual service, because each valve is designed to give maximum performance under the actual operating conditions it will encounter.

Catalogs on request. Kindly state whether you are chiefly interested in Bronze, Iron, Cast Steel or Corrosion-Resistant Valves.

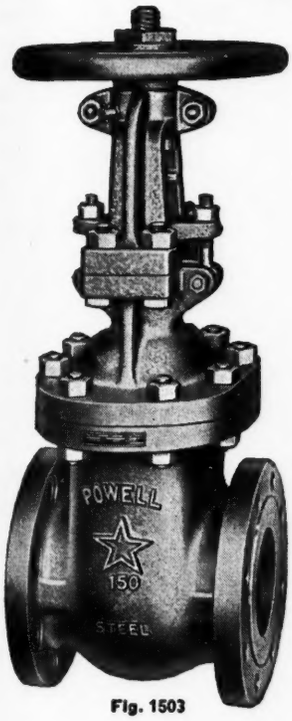


Fig. 1503

Class 150-pound Cast Steel Gate Valve. Has flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc.

Powell Cast Steel Valves of all types are available in pressure classes from 150 to 2500 pounds, inclusive.

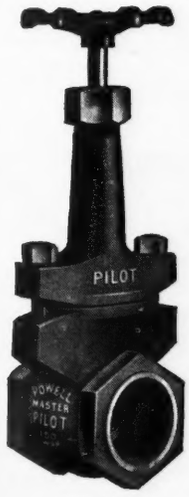


Fig. 1460

Iron Body Bronze Mounted "Master Pilot" Gate Valve. Screwed ends, rising stem, bolted flanged bonnet and taper wedge solid disc.

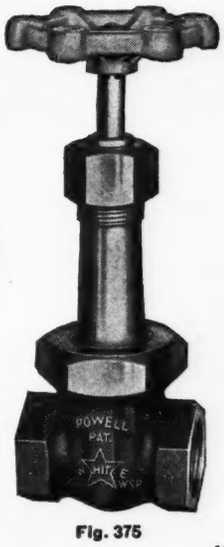


Fig. 375

200-pound Bronze Gate Valve with screwed ends, inside screw rising stem, union bonnet, renewable, wear-resisting "Powellium" nickel-bronze disc.

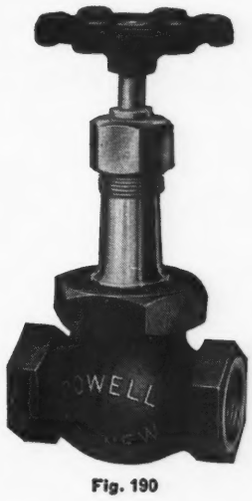


Fig. 190

150-pound Iron Body Bronze Mounted "Irenew" Globe Valve. Has screwed ends, union bonnet and regrindable, renewable, wear-resisting "Powellium" seat and disc.

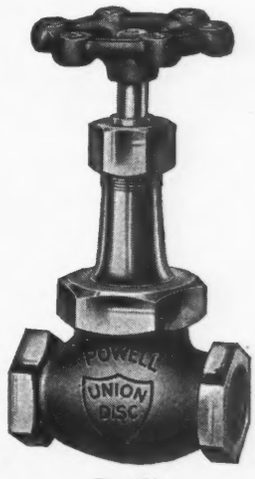


Fig. 150

150-pound Bronze Globe Valve. Screwed ends and union bonnet. Regularly furnished with renewable vulcanized composition disc but special discs can be supplied for a number of different services.

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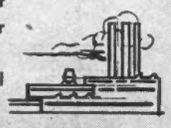

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JACKSON & CHURCH CO.
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are unharmed by hot water and ordinary disinfectants. At the end of the day, the machine is hosed down either with hot water or a disinfectant solution. To thoroughly cleanse the machine, about one-quarter man-hour is required.

Approximately 10 percent of the fillets must be trimmed by hand because of defects. This leaves 90 percent of the fillets untouched by hand during the cutting or filleting operation. A large amount of bacteria, adhering to the surface of the fish, is washed away by multiple sprays. This eliminates, to a great extent, contamination of flesh by knives.

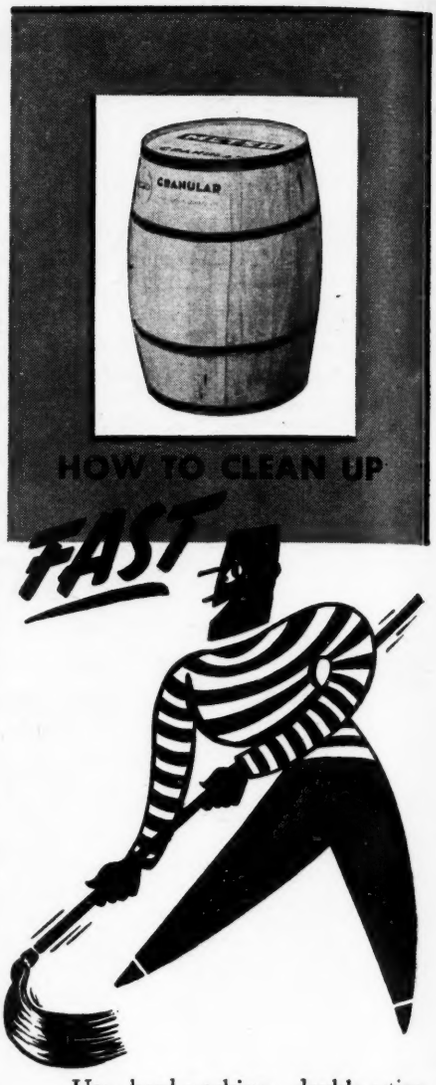
Three Types of Machines

In addition to the cod and haddock machine, the Atlantic Coast Fisheries Co. has perfected two other machines. The cod and haddock machine cuts fish ranging from ¾ to 10 lb., with a safety margin in each direction. To cut fish in this size range, the following adjustments are made: (1) From ¾ to 2 lb., covering the scrod range; (2) from 2 to 5 lb., covering the haddock range and (3) from 5 to 10 lb., covering the large fish range. Commercial fish grading roughly falls into the above three ranges. Since the varieties and grades of fish are never cut mixed, adjustments need only be made to handle one grade or size range at a time.

The other two machines fillet rosefish and whiting. Both are automatically adjustable for the full size range of the two varieties. They are constructed along the same principles of the cod and haddock machine. Savings, sanitary and mechanical features are essentially the same. These machines are, however, smaller and are operated at a much higher speed. The whiting machine operates at a speed of 100 fish per minute, cutting fish from ¼ to 2 lb. The rosefish machine cuts 75 fish per minute, handling fish ¼ to 2½ lb.

Leasing Machines

E. H. Cooley, president of the Atlantic Coast Fisheries Co., states that the automatic Hunt filleting machines will be made available to the industry. The policy of leasing the company's machines is now being formulated by active discussion with prospective licensees. It is the intention of the company to work out a fair and equitable arrangement whereby the machines can be used. Response on the part of the industry to the filleting machines has led the company to order a total



Use hard-working, double-action Metso Granular that lifts the grease on the first cleaning. Metso Granular is more than just an alkali. Its plus value is properly proportioned soluble silica, which works along with the alkali. This accelerates the cleaning action by speeding up wetting, emulsification, and removal of grease and oil.

Send for a free sample. Compare Metso Granular results on such general clean-up jobs as floors, kettles, tanks.

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METSO
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Artist – Stuart Davis, native of Pennsylvania

PENNSYLVANIA—*annual purchases: $5½ billion—mostly packaged.*

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Save Waste Paper

WANTED: YOUR SPRAY PROBLEMS!

Fig. 629

DO YOU WANT TO:

Wax Fruits?
Rinse Vegetables?
Powder Milk?
Dry Eggs?
Wash Filter Cake—
Humidify Banana Rooms?

Monarch Spray Nozzles are doing these and innumerable other Food Processing jobs. If your liquid can be sprayed with direct pressure Monarch can supply the nozzles.

Outline your problem so that we may make recommendations.

Send for Catalogs 6-A and 6-C

MONARCH MFG. WORKS, INC.
3307 Salmon St. **Philadelphia 34, Pa.**

Design for Food Packaging

Can we help you plan the packaging for the new products you are going to bring out — or restyle and modernize the packaging of your present products? . . . Our Design and Sample Department is now doing much forward work on *Folding Cartons* and *Shipping Containers* even though shortages of raw materials and equipment unfortunately prevent us at the moment from taking on new business.

HUMMEL & DOWNING COMPANY
MILWAUKEE 1, WISCONSIN

WASTE PAPER IS A VITAL RAW MATERIAL . . . SAVE IT . . .

of 32 filleting machines. Four are cod and haddock and 28 are rosefish machines. The American Machine & Foundry Company, which is constructing the machines, promises delivery early in 1947. The machines for lease are essentially heavy duty production units and are limited to use in filleting cod, haddock, pollock, rosefish and whiting.

General operation of filleting machines will mean further mechanization of the fish industry and a corresponding change in its economic basis.

—End—

Foil Package

(*Continued from page* 95)

of 120. After shipment and 3 days' storage at 40 deg. F., readings were 125 for peas in aluminum and 133 for those in cardboard. Shelled peas remain tender during shipment and storage if wrapped in aluminum foil, while those in cardboard containers become tough. There is little difference in the tenderometer readings between peas in the pod kept in aluminum foil and cardboard containers. Those in aluminum foil, however, were slightly superior to those in cardboard containers.

The foregoing results are expressed in graphical form in Fig. 1 and Fig. 2. For convenience, the maximum or most desirable factor was assigned a value of unity. Other results are expressed as percentages of that value. For example, in the instance of weight loss, no loss is both maximum and the most desired, so it is assigned a value of 1. A loss of 2 oz. per 11 oz. container or an 18 percent loss, is assigned a value of 0.82.

Storage times used in these charts refer to air shipment alone, or to air shipment and subsequent storage at temperatures indicated. Two days at 60 deg. F. were two days in flight at an average cabin temperature of 60 deg. F. Five days at 40 deg. F. means that the peas were two days in flight at 60 deg. F. and subsequently stored for three days at 40 deg. F. Five days at 70 deg. F. means that the peas were two days in flight at 60 deg. F., then placed in storage at 70 deg. F. for three days.

Some of the factors contributing to better quality peas have been established. Other factors are the following:

(1) Air exclusion; (2) modified atmospheres within the package;

Special multi-stage ejector for service in a processing plant.

A single-stage, twin-element ejector mounted on a surface-type combination precooler and aftercooler.

GETTING THE MOST out of a vacuum

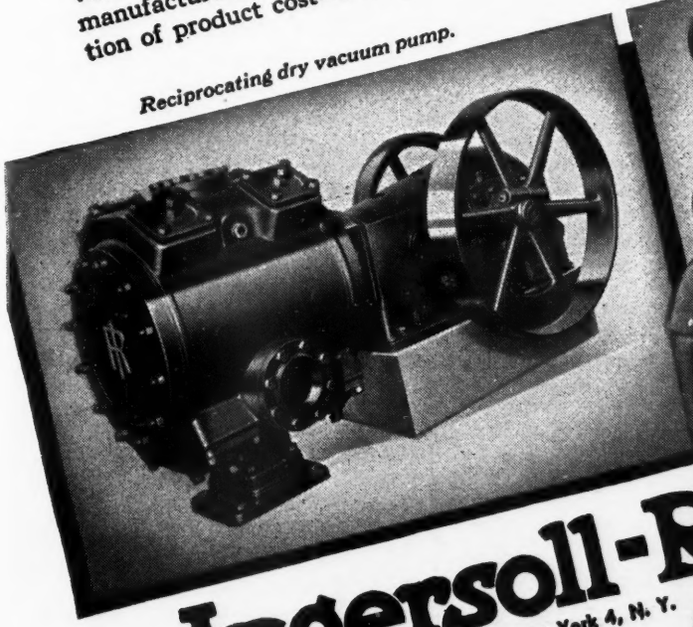
The process operator who is trying to boost production, cut costs, or improve product quality knows that his vacuum-producing equipment must be exactly suited to his specific application, and that it must be capable of sustained, trouble-free operation.

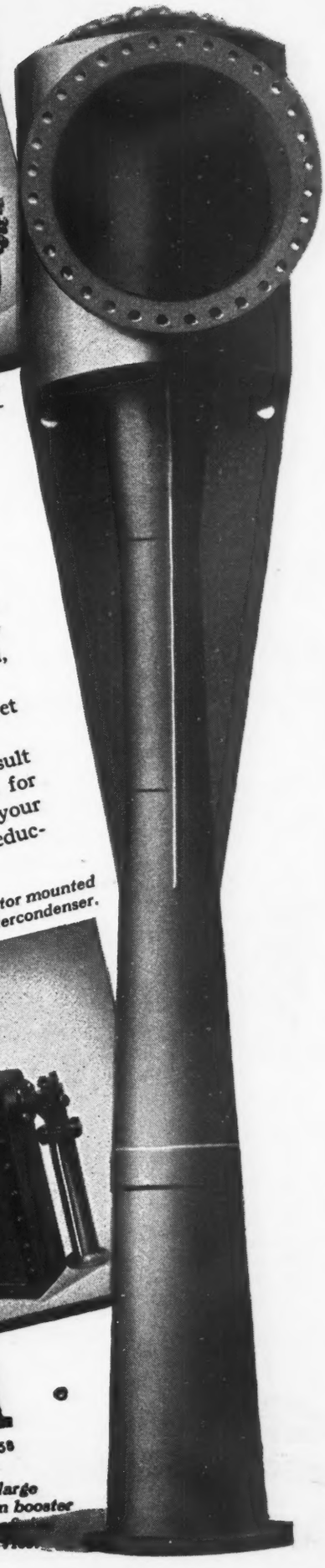
This is the kind of performance you will get from Ingersoll-Rand Steam-Jet Ejectors, Condensing Equipment, and Reciprocating Dry Vacuum Pumps.

If you have a problem or process that requires a vacuum, why not consult Ingersoll-Rand? Perhaps our specialists can suggest a new application for vacuum producing equipment that will enable you to get the most from your manufacturing process—the most in processing efficiencies—the most in reduction of product cost—the most in product improvement.

Reciprocating dry vacuum pump.

A two-stage, single-element ejector mounted on a direct-contact type intercondenser.





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A large vacuum booster

"ON THE RECORD"
facts about
Scientific Quality Control

SCHWARZ INVESTIGATION

quickly detected cause of serious complaints of flavor

A manufacturer of sweet eating chocolate was suddenly deluged with complaints that his product had become very bitter. As no change had been made in raw materials or the manufacturing process, management could find no explanation for the bitterness.

A Schwarz consultant was called to the factory. After checking each department thoroughly, he traced the abnormal bitterness to the moulding room. His investigation revealed that water from a neighboring picric acid plant sometimes entered the wells from which the chocolate plant drew water for washing its moulds. Even small amounts of this water carried sufficient picric acid to render the chocolate unsuitable for consumption. As soon as this situation was corrected, the factory resumed profitable production of high-quality sweet eating chocolate.

Our bulletin "Scientific Quality Control of Foods and Beverages" describes our services in detail. Be sure to write for your copy today.

Schwarz chemists, engineers and scientists are prepared to test your product—improve processing and production methods—recommend the profitable solution to your most puzzling problem.

Schwarz
LABORATORIES, INC.
202 EAST 44th ST.
NEW YORK 17, N. Y.

(3) protection against light; (4) heat insulation and (5) any changes in the nutritional value of the peas.

References

1. A. L. Martin, Who Will Ultimately Prepackage Fresh Produce for the Consumer? Western Growers Association, 20th Annual Meeting, Los Angeles, Cal., Dec. 6, 1945.
2. F. Oxarart, Prepackaging—It's a Post-War Must in Top Markets, California Fruit And Vegetable Review, vol. 6, no. 59,24, 1945.

—End—

Coconut

(*Continued from page* 93)

freight copra from plantations. The Lava process has been developed to meet these requirements, and a pilot plant is now being tested for its technical and commercial possibilities.

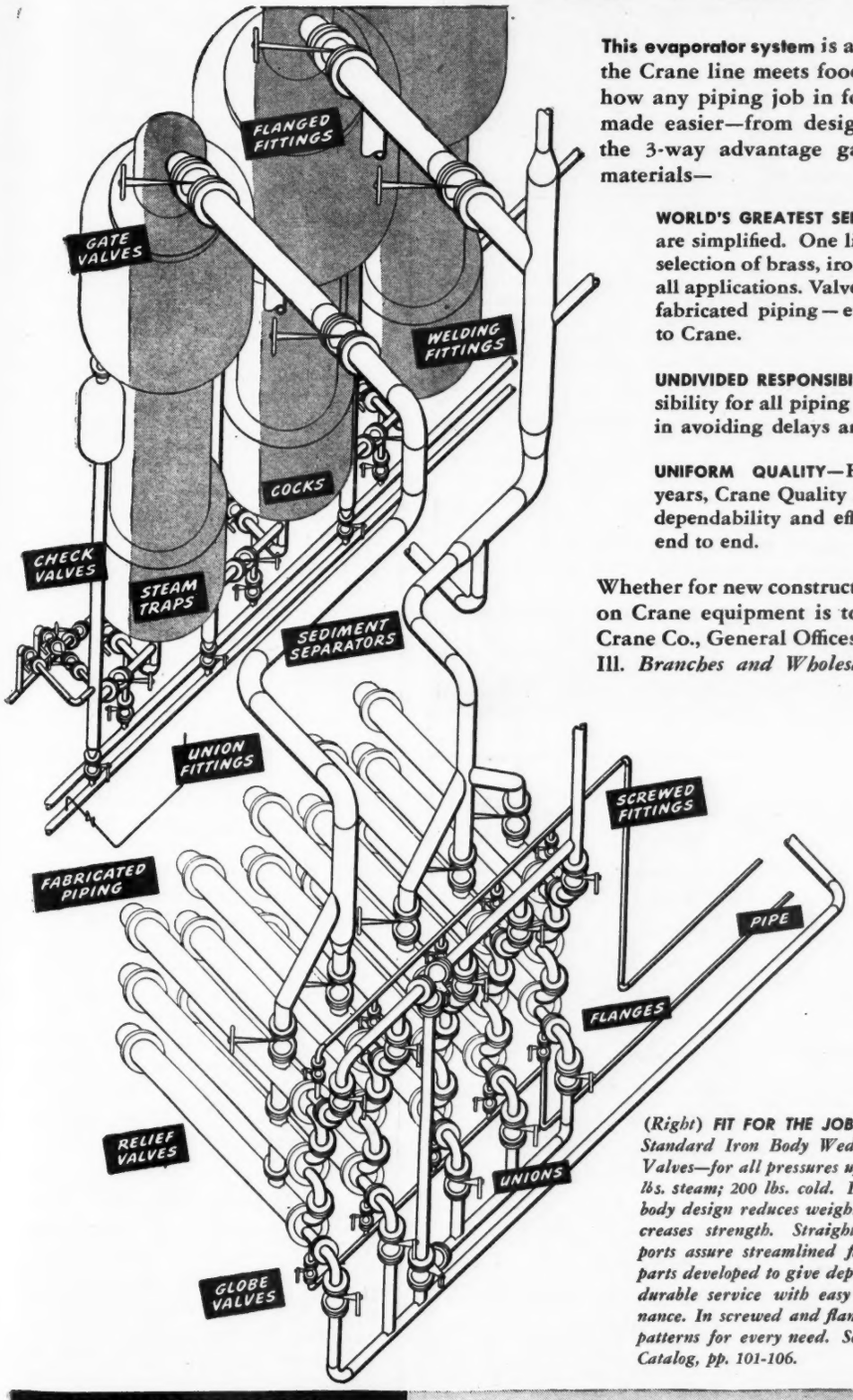
Working without excessive pressure and heat, the process consists essentially of extracting the *gata* from the fresh meat; processing the *gata* to separate the cream from the "skimmed milk" or maceration fluid and from the protein solids. Subsequently the cream is treated and processed to break up the oil-water-protein emulsion, thereby separating the oil in its free state. The process yields two edible by-products; the *sapal* or cake, which may be used as a flour substitute, and the skimmed milk which contains amino acids in its protein constituent in addition to carbohydrates (mostly sugars) and fats. This may be concentrated and spray-dried like cow milk. All parts of the plant such as washers, comminuters, roller presses, driers, expellers, filter presses, grinders, evaporators, spray driers, cream tanks and centrifuges are standard equipment though some have to be adapted from uses in mining and ore treatment.

Use of By-Products

The coconut shell is an important by-product in the coconut industry, which may in future equal that of the oil in value. The production of coconut charcoal was taken up before the war and found a ready market in the chemical war industries in the United States. Exports rose rapidly from 1,160 tons in 1939 to 6,294 tons in 1940, to average 1,000 tons a month in 1941.

The activated charcoal of the coconut shell has a number of peacetime uses which insure the industry of a steady market.

How to Speed and Simplify Food Plant Piping Jobs



This evaporator system is a typical example of how completely the Crane line meets food process piping needs. And here's how any piping job in food packing and canning plants is made easier—from design to erection to maintenance—by the 3-way advantage gained in standardizing on Crane materials—

WORLD'S GREATEST SELECTION—Specifying and buying are simplified. One line gives you the most complete selection of brass, iron, and steel piping materials for all applications. Valves, fittings, pipe, accessories, and fabricated piping—everything secured on one order to Crane.

UNDIVIDED RESPONSIBILITY—You put complete responsibility for all piping materials on Crane—a big help in avoiding delays and getting the best installation.

UNIFORM QUALITY—Highly respected through 90 years, Crane Quality in all materials assures uniform dependability and efficiency in piping systems from end to end.

Whether for new construction or replacements, to standardize on Crane equipment is to help stabilize your piping costs. Crane Co., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Industrial Areas.*

ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY

(*Right*) **FIT FOR THE JOB**—*Crane Standard Iron Body Wedge Gate Valves—for all pressures up to 125-lbs. steam; 200 lbs. cold. Improved body design reduces weight, yet increases strength. Straight-through ports assure streamlined flow. All parts developed to give dependable, durable service with easy maintenance. In screwed and flanged end patterns for every need. See Crane Catalog, pp. 101-106.*

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
HEATING • PUMPS

CRANE

FOR EVERY PIPING SYSTEM

FACTS FOOD PROCESSORS SHOULD KNOW ABOUT

PlasTex

The Plastic Coated Food Belting

1 PlasTex *is not* a rubber, synthetic rubber or nitro-cellulose compound coated belting, and should not be confused with these. There is *only one* PlasTex Belting.

2 PlasTex is a specially developed plastic coating that is impervious to oils, greases, alkalis, and moistures. It's a tough coating . . . made to resist temperatures up to 240° Fahrenheit.

3 PlasTex *is* easy to clean—improves sanitation because it doesn't absorb odors or food particles.

4 PlasTex *outwears* other coated and uncoated beltings. Proof of this is to be found in results obtained by leading food processors, all over the U. S. A.

GET THE WHOLE PLASTEX STORY—
AND A FREE SAMPLE. WRITE DEPT. C.

BUFFALO WEAVING & BELTING COMPANY

Chicago Buffalo 7 N. Y. New York

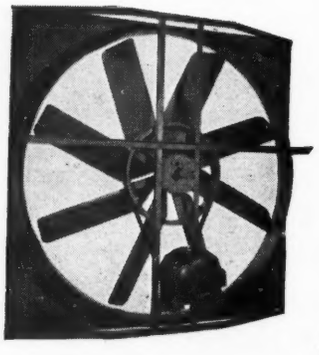
Serving Industry for Over Fifty Years

BETTER EMPLOYEE RELATIONS

WITH

Coolair TRADE MARK

EXHAUST FANS



CONTENTED WORKERS are the back-bone of any efficient working organization. Personnel directors are enthusiastically pointing to COOLAIR Breeze Conditioning as an aid in stepping-up this efficiency by adding to the comfort and health of their workers.

COOLAIR'S TYPE O FAN shown here is available in 16 sizes, with air deliveries from 6,?00 to 48,000 C.F.M. It is easily installed in window openings, side walls or on the roof . . . in single or *multiple*-unit installations.

COOLAIR DEALERS or AGENTS will gladly make a survey of your plant without obligation, or further information may be obtained by writing us direct.

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AMERICAN COOLAIR CORPORATION

"Pioneer Manufacturers of V-Belt Drive Exhaust Fans"

3604 Mayflower Street Jacksonville 3, Florida

The National Electric Corp., an American concern, in Manila, cooperated with NACOCO technicians in researches relating to uses of coconut charcoal in electrical industries. They established a factory in 1941, capable of producing 25,000 flashlight batteries, 2,000 telephone batteries, 300 radio "B" batteries and 100,000 carbon electrodes a day, containing from 30 to 100 percent ingredients derived from coconut shells. Activated charcoal also was produced.

—End—

Browning

(*Continued on page* 79)

absorbed by the crystals, (3) dark colors formed during storage of sirups and molasses cause commercial losses, (4) formation of melanoidins is an important factor of economic importance in "froth fermentation" of massecuites and molasses, (5) caramels and melanoidins reduce Fehling' solution and are paid for by distillers at the same rate as reducing sugars, (6) the reducing power of coloring matters causes errors in the analysis of sugar products.

Potato Products

Reactants responsible for browning of potato chips and dehydrated potatoes are extracted from thin potato slices by hot water. This was revealed by A. R. Patton and W. E. Pyke, Colorado A & M College. Potato chips made from hot-water-extracted slices are white. Immersion of extracted slices in a concentrated hot-water extract restores original browning. Analysis of the potato extract showed reducing sugars and amino acids. If hot-water-extracted slices are immersed in a solution containing glycine or other amino acids and glucose or other reducing sugars, browning is produced upon frying.

In Dairy Products

J. P. Kass, Interchemical Corp., New York City reported that browning in dairy products is a composite of several reactions among reducing sugars, proteins, milk salts and the atmosphere. Its nature depends upon concentrations of the reactants, heat and storage. Color of sweetened condensed milk develops progressively with inversion of cane sugar. Discoloration of powdered whey and dried skim milk is accelerated by storage over 30 deg. C. and 30 percent R. H. Oxidation of certain added anti-oxi-

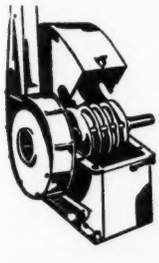
FMC VACUUM FILLER

STAINLESS STEEL EQUIPMENT

FMC STRAIGHT LINE SYPHON FILLER

FMC TUMBLING BATCH MIXERS

FMC DRY POWDER MIXERS



FMC PULVERIZER

FMC BELT CONVEYOR

You won't wait long ★

FOR SHIPMENT

Of this NEW FMC EQUIPMENT!!

(★ Quicker than you thought possible.)

It takes real ability to be a successful purchasing agent today. Whatever they call you, whether it may be EXPEDITOR—PLANT SUPERINTENDENT—DIRECTOR OF PURCHASERS—CHIEF ENGINEER, etc.—will not make any difference when you come up with the equipment they've been howling for.

Then they'll call you "Blessed" and we hope FMC will be your source. Frankly we have pleased many "P.A.'s" lately because we can ship quite a few machines immediately. Try us.

(Note—See our other advertisement on page 257 of this issue)

First MACHINERY CORPORATION

• New Headquarters . .

157 HUDSON ST., NEW YORK 13, N. Y.

• PHONE WOrth 4-5900 •

FMC PORTABLE AGITATORS

FMC PORTABLE CAP TIGHTENERS

FMC SYPHON FILLERS

FMC STAINLESS STEEL KETTLES, TANKS and VACUUM PANS;

— AND MANY OTHERS NOT SHOWN HERE

Improved production of fine and ultra-fine powders thru

MECHANICAL PULVERIZATION

—this new Book contains everything you want to know about pulverizing. Send for your copy today

This valuable book—soon off the press—tells you how to produce fine and ultra-fine powders; how to test the value of fine and ultra-fine grinding right in your own laboratory or pilot plant before starting full production schedules; how to control particle size, blending and dispersing, accurately; how to select the proper mechanical pulverizer for your needs; as well as many other important facts about pulverizing.

Send for this new book today and learn why it is decidedly to your advantage to use a MIKRO-PULVERIZER or one of the new MIKRO-ATOMIZERS in your pulverizing operation.

PULVERIZING MACHINERY COMPANY
97 CHATHAM ROAD • SUMMIT, N. J.
NOW . . . 2 TYPES TO MEET MOST PULVERIZING NEEDS

MIKRO-PULVERIZER (FINE)
MIKRO-ATOMIZER (ULTRA FINE)
Reg. U. S. Pat. Off.

PULVERIZING MACHINERY CO., 97 Chatham Rd., Summit, N. J.
Please send me a copy of your new Book when it is ready.

Name.....*Position*.....
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Mail this coupon with your company letterhead

dants is a contributing but unrelated factor in the discoloration of prepared ice cream mixes. The browning reaction is characterized by development of acidity, drop in pH and oxidation-reduction potential, slight loss in copper-reducing ability, conversion of aldoses to ketoses and loss in optical activity.

—End—

Freezer Locker

(*Continued from page* 100)

ation and meet his market requirements.

In the same town a freezer-locker plant of the general type shown in Fig. 1, is going into operation. While the plant is equipped to freeze small quantities of fruit and vegetables, the owner is more interested in the fine quality meat animals which are raised in the surrounding areas and shipped north for processing. He plans a modern slaughter house and equipment to handle meats and poultry, from the farm to locker storage or local distribution.

Processing Markets

The farmers in the agricultural area will have local processing markets, in addition to their present limited fresh markets, for all the agricultural products they can profitably raise. Both town and rural population will have a wide variety of fine home grown foods available for year round consumption. What processed food they import will probably be more than balanced by the commercial packs sent out from these plants.

In Asheville, North Carolina, the Federated Farmers built a large locker plant during the war to serve the surrounding mountain agricultural areas. This plant has had to increase its facilities to take care of an exceptionally large salt curing service to its renters. Another plant has been built in North Carolina by the same organization. Although they have done practically no freezing, except for their locker renters, they have decided to skip any pilot plant operations, and enter commercial freezing. Two plants are in the blueprint stage ready to go ahead as soon as materials are available. One of these will be a poultry freezing plant. North Carolina has previously had no commercial freezing plants in operation. Their strawberries and peaches have been going to Norfolk, Virginia, and to other states to be processed.

Yes, you can count on these extras *every time* you order a new product from Diversey.

Overalls . . . that's what the Diversey D-Man will be wearing in your plant while he services the drum or barrel of material you've ordered.

Perspiration . . . it'll flow freely from your D-Man. He'll be at it hot and heavy . . . whether it takes several hours or several days . . . until he has made certain your plant men know how to use the Diversey product ordered properly and to best advantage.

Book-learning . . . the Diversey D-Man has had plenty. He's a trained specialist in food plant sanitation. Each new man joining Diversey is given weeks of intensive class-room instruction followed by special courses while in the field.

When it comes to sanitation, Diversey alone offers these "extras." Next time *you* have a sanitation problem, call in a Diversey D-Man. THE DIVERSEY CORPORATION, 53 West Jackson Blvd., Chicago 4, Ill.

DIVERSEY

Complete Sanitation Service

FOR THE MODERN FOOD PLANT

DIVERSEY PRODUCTS FOR THE FOOD PLANT

Diversol—A quick-acting disinfectant combining sodium hypochlorite and alkaline sodium phosphate in crystal form. Disinfects without corroding equipment.

D-Luxe—The ideal product for daily hand or machine cleaning of equipment.

Relion—A triple-action compound that assures clean, sparkling bottles.

Mirrolite—For bottle washing in hard water areas.

Heavy Duty—Cleans copper vacuum pans.

Scalite—Prevents scale deposits in rinse tanks.

Everite—For removing scale and encrustations from bottle and can washing machines, vat coils, condensers, and other equipment.

Novex—Delivers clean, sweet-smelling cans at low cost.

Canrite—Removes milkstone from cans quickly and safely by machine washing.

Dilac—Removes milkstone from plate-type pasteurizers.

Dicolold—Used in paste-form to remove milkstone.

SEE DIVERSEY EXHIBIT BOOTH 317, DAIRY INDUSTRIES EXPOSITION, ATLANTIC CITY

RIGHT TO THE HEART OF

YOUR PEST CONTROL PROBLEM!

"A partial kill of insects results in poor control and is of no value. Studies of the spread of infestation through a mill after a general fumigation show . . . if the kill is not complete the mill may become thoroughly infested again within a few weeks . . ."

This is what experts say, and many a food processor can confirm it, from sad experience!

However, the waste of money on ineffective pest control measures, the loss of time for no good purpose, the threat to profit and reputation through continued infestation can *all* be avoided by properly applied Methyl Bromide!

It penetrates—going directly and rapidly to the most inaccessible hiding places of all food pests—and killing surely when it reaches them!

In the hands of skilled fumigators Methyl Bromide *controls* infestation—without long costly shut-downs, without the installation of special, expensive equipment, and without the possibility of harm to your food products!

WRITE FOR DETAILS

One of America's main producers of Methyl Bromide, Westvaco offers at no cost or obligation, a constructive, on-the-job, technical service in connection with your problems, advising on every phase of fumigation, and furnishing, if requested, the names of the competent fumigators nearest you.

Westvaco CHEMICALS

METHYL BROMIDE

FOR EFFECTIVE FUMIGATION

WESTVACO CHLORINE PRODUCTS CORPORATION

405 LEXINGTON AVENUE · NEW YORK 17, N. Y.

CHICAGO, ILL. GREENVILLE, S. C. NEWARK, CALIF.

Trend To Meats

A trend toward greater use of their plant facilities for processing and distributing meats was obvious from the problems discussed at Southeastern Locker Association meetings this spring. With a modern plant, the operator can slaughter, chill, age, cut up and stock frozen packaged meats as the grocer stocks canned goods. Shelves filled with T-bone steaks, rib roasts, hamburgers, fresh pork chops, or bacon and hams from the salt cure storage, enable him to give the local restaurants, schools, and institutions, a service which is greatly needed in the small towns, and seems to be appreciated in the cities. A large part of this has been done with packing house meats, but many of the post war plant plans include a modern, sanitary slaughter house; which should remove farm butchering from under the apple tree and end the attendant sanitary and spoilage hazards.

A progressive operator in a large Tennessee city purchases packing house beef which he cuts and packages for sale, either fresh or frozen. In normal times he buys and cuts in sufficient volume to fill quantity orders for steaks, fillets, rib roasts, etc. Tough parts are ground for hamburger which finds a ready sale. The bones from his own beef and that processed for his locker patrons, are simmered with salt, pepper and onions for seasoning, producing an excellent soup stock which is packaged, frozen and sold. Among other precooked items, he prepares and freezes New England boiled dinners which, surprisingly, are a popular item in this southern city. Other precooked foods are being included.

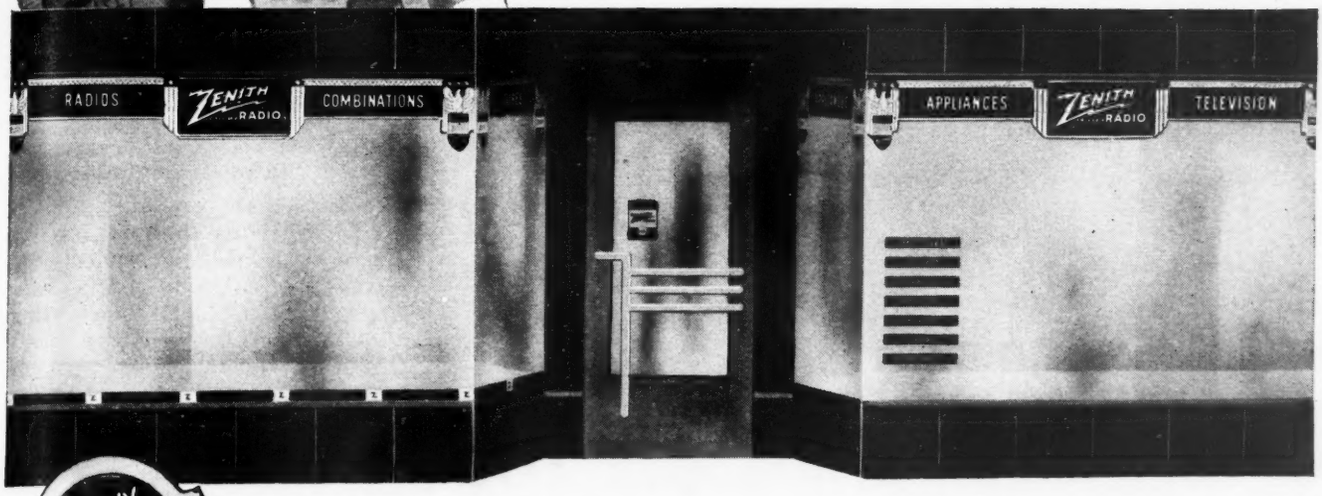
He is planning a complete frozen food supply business, including his own and commercial packs, not only to hotels and restaurants, but through frozen food centers in the leading retail department stores, to retail customers with or without frozen storage cabinets.

Hotel Supply Service

Another city operator in Tennessee is operating a comprehensive hotel supply service in fruits, vegetables, fish and poultry, with packaged frozen meats to follow as soon as supplies for freezing are available.

A progressive operator in Alabama, who has made a study of utilizing the less desirable and waste parts of the animals he handles, can almost equal the packing house boast of using everything

...and MEYERCORD WINDOW VALANCES ARE THE HEADLINES



DECALS IDENTIFY dealers . . . INVITE customers . . . INCREASE sales!

Acres of store fronts along America's Main Streets offer "free space" advertising opportunities to alert national advertisers...*right now*! Make this valuable space the spearhead of powerful point-of-sale advertising for your brand of product. Meyercord Decal window valances...economical, durable, easy to apply...stop shoppers—clinch their patronage. They offer more advertising value per square inch, per year, per dollar. Headline *your product* on Main Street for bigger profits with Meyercord Decal window valances.

Let's Talk Over YOUR Plans . . . NO OBLIGATION

Skilled merchandising men, artists and production technicians at the "world's largest manufacturer of decals" will gladly assist you in preparing an attention-compelling, sales-building Decal window program.

And Here's "SPOT NEWS" at YOUR DEALER'S DOOR!

Meyercord Decal signs on windows and doors are additional spot markers along your profit path. They are sales clinchers, literally guiding the buyer's feet through your dealer's door. Carefully planned spot window signs, door signs and valances team up to lend local power to national advertising. They stimulate *action* at the point of sale. Durable, washable, inexpensive, they can be produced in any design, colors or size. It will pay you to investigate the value of a complete store-front Decal program . . . NOW!

Executives: Send for Decal Ad-Visor... FREE!

This helpful guide to Meyercord Decal advertising is offered business executives . . . FREE. Shows how and where successful advertisers use Decals. Write for it on your company letterhead. Address inquiries to Dept. **65-10**

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World's Largest Decalcomania Manufacturers

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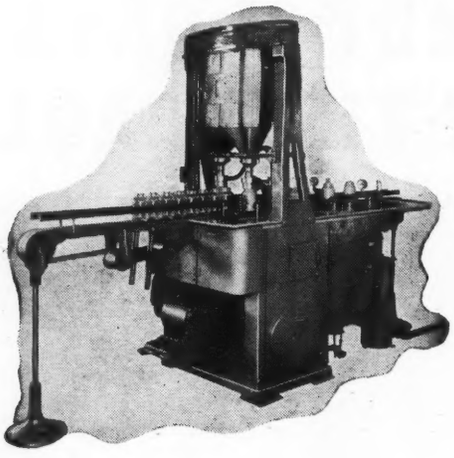
IF YOU PACK . . .

POWDERS IN GLASS



THE S&S HG-84 . . .

WILL PACK THEM FOR YOU

Yes, sir, and you get a *dustless* fill and a tight pack. The Stokes and Smith HG-84 Duplex Heavy Duty Filling Machine answers all the questions for any packer who merchandises powders in jars.

The secret is the "Auger-Vac", or auger-vacuum system, with which the machine is equipped. Combining the speed and accuracy of the auger feed with the dustless feed of the vacuum method, the efficiency of this system has been proven by leading packers throughout the country.

The HG-84 with "Auger-Vac" is available in various types. It fills not only jars, but cans or other air-tight containers with pulverized coffee, powdered milk, ice cream mix, malted milk, cocoa or numerous similar products, in the amount desired.

"Speeds to suit your needs": 15 - 25 - 50 - 100 per minute; "Auger-Vac" method may be used also on other S & S Single Unit Filling Machines. Full particulars on request.

WE REGRET, that we can't ship you a machine as soon as we would like; it's impossible to build them fast enough to keep up with the demand . . . but there'll come a day, we hope, when orders can be filled reasonably soon after receipt.

STOKES & SMITH Co

4911 Summerdale Ave., Philadelphia 24, U. S. A.

Filling • Packaging • Wrapping Machines

"Better machines for better packages"

but the squeal of the pig. One of his most popular products is camp stew, which is apparently an Alabama version of the southern Brunswick stew, but employing the meat from surplus hogs' heads as a principal ingredient. This is a good example of making the most of a plant's facilities. In addition to salt curing and meat processing and freezing operations, he reports packing 4000 pounds of eggs for sale to local bakeries, 4000 pounds of strawberries, 1000 quarts of dewberries, as well as other fruits and vegetables which may be available and for which he has sufficient capacity.

No Statistics Available

Unfortunately there are no statistics summarizing the total production of these small independent food processing plants. Georgia estimates its 100 plants aggregating 57,000 lockers rented by 45,000 families, handle 28,000,000 lb. of food annually. With 50 more planned or under construction, they anticipate a total of 500 plants within three years. Tennessee has 92 plants with many more waiting for priorities to start building. North Carolina stated they had been building at the rate of 2½ a month which they expected to step up to 5 a month before priorities were shut off in favor of veterans' housing. Other states report they are increasing the number of their plants at comparable rates.

With the economic interests of the plant owner, the farmer, and the community coinciding, this trend toward decentralization of food processing shows every evidence of becoming a permanent feature of Southeastern economy.

—End—

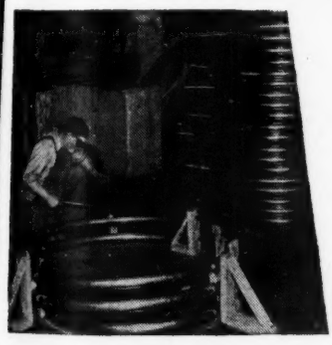
Better Lighting

(*Continued from page* 106)

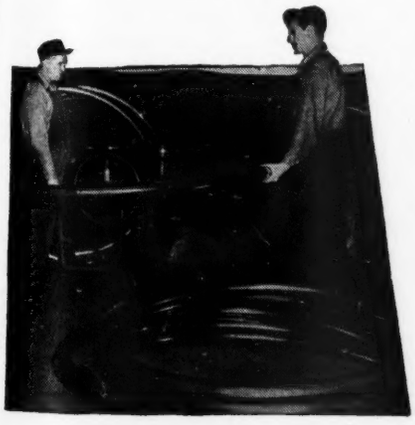
storage, and reduce a number of those accidents with small trucks where the driver misjudges a clearance and something or someone gets sideswiped. For dead storage areas, where there is very little movement and no critical seeing or identification to be done, 5-foot-candles may be sufficient. One common problem in lighting storage areas occurs when cartons are piled up to the ceiling, even around the lighting fixtures. It may be well to move the fixture to a new location in that case, so as to get maximum use of storage space and adequate lighting for circulation.

Preparation, Canning, Processing, Labeling, and General Illumination In

Coiled...and READY to STRIKE at HEAT TRANSFER PROBLEMS



FINISHING A PURE NICKEL *cooking coil by gas welding at the plant of* THE AMERICAN COPPER AND BRASS WORKS. *The coil shown here has an outside diameter of five feet.*



LIGHTWEIGHT PURE NICKEL *tubing is easily handled. Cold-forming of this 9-ft. section presents no problem to these employees of* THE AMERICAN COPPER AND BRASS WORKS, *Cincinnati 2, Ohio.*

You can't beat a heating and cooking coil like this one.

It's made of ***Nickel.*** And it brings big advantages to equipment built for the Food Machinery Corporation, 101 East Maple Street, Hoopeston, Ill., by ***The American Copper and Brass Works,*** Cincinnati 2, Ohio.

Nickel, for example, ***protects product purity.*** It does not contaminate or discolor foods. It is rustproof, and highly resistant to corrosion by syrups, brines, milk, fruit juices, soups, tomato products and beverages.

In nickel, ***excellent heat transfer properties*** are combined with high tensile strength. It is practical, therefore, to increase heat transfer rates by using relatively light-walled tubing for coils.

These coils, in addition to being strong, are also ***tough.*** They are not easily marred or damaged. Their ***surfaces stay smooth.*** Both time and labor are saved in cleaning operations between batches.

Then there's this not-to-be-overlooked characteristic of nickel: it is readily formed, cut, machined and welded. In other words, nickel is not only fabricated into rugged, long-lasting equipment, but it is ***fabricated economically.***

HELPFUL BOOKLET FREE. Detailed information about ***Heat Transfer Through Metallic Walls*** is given in our illustrated booklet which carries that title. Drop us a line—preferably on your business letterhead—and we'll get your free copy of this valuable reference manual into the next mail.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK 5, N. Y.

USE PURE NICKEL WHERE PURITY COUNTS

Vertical Storage with BAKER TRUCKS

more than doubled Storage Facilities

Hy-Lift Truck illustrated has oversize "safety" platform providing greater carrying space. Operator can raise or lower load by remote control from the platform.

(Inset, above) Baker Low-Lift Truck moves capacity load easily up a 10% ramp 70 feet long.

(Below) This 4000 lb. Baker Truck does double duty. Besides its own big load, it hauls a loaded trailer.

In 1926, Merck & Co., Inc. bought its first Baker electric truck. Twelve years ago they found that storage along horizontal lines provided inadequate warehousing space to meet increasing needs. Rather than build an addition, they decided to install a Baker Hy-Lift Truck to tier material, thus using available vertical storage space. So successful was this truck—not only in providing more storage capacity but also in speeding material movement—that more and more were installed, until today the Company operates a fleet of 18 Baker Trucks: Eleven Hy-Lift Trucks, two Low-Lift Trucks, two Fork Trucks, and three Platform Trucks. Besides obviating the need for new building by increasing existing storage facilities, these trucks are conserving time and manpower on handling operations throughout the plant.

A Baker Material Handling Engineer can help you make similar savings. Write for information.

BAKER INDUSTRIAL TRUCK DIVISION *of the Baker-Raulang Company*
2146 West 25th Street • Cleveland 13, Ohio
In Canada: Railway & Power Engineering Corporation, Ltd.

Baker INDUSTRIAL TRUCKS

Sorting and Grading Rooms—About 30 Foot-Candles. This is comparable to the general lighting in modern machine shops. In the preparation and processing areas, the illumination should be of moderate intensity, evenly distributed, shadowless and soft. A considerable amount of the seeing is done on vertical surfaces—the sides of cookers, cans and machines. For this reason, general illumination should be with wide angle, distributing units rather than by narrow beam concentrating reflectors.

Sorting and Grading—About 100 Foot-Candles. The work here involves the discrimination of small defects and color differences under conditions of poor contrast over long periods of time. This 100 foot-candle recommendation for sorting tables or conveyors is just a general guide. The intensity actually needed depends on the visual task—what your sorters or graders are looking for. Such higher intensity lighting should be localized. It isn't necessary, or even advisable, to light the entire sorting room to 100 foot-candles. If the conveyors are lighted to that intensity, however, then the general room illumination should preferably be 30 foot-candles or more to avoid sharp contrasts.

End

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• Laboratory

to meet the needs of your Organization

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